

FALL 1986

ANTHROPOLOGY 101

INTRODUCTION TO BIOLOGICAL ANTHROPOLOGY

INSTRUCTOR: Corinne Shear Wood, Ph.D.
OFFICE: McCarthy Hall 177
PHONE: 773-3564
OFFICE PHONE: 773-3626

OFFICE HOURS: TH 0830-0930; 1150-1220; 1830-1900; and by appointment

TTh 11:00 same class meets.

REQUIRED TEXT: Nelson, Harry and Jurmain, Robert. Introduction to Physical Anthropology, 3rd ed., West Publishing Co., 1985.

Supplementary reading assignments and study sheets will be distributed in class. Occasionally, there may be a small duplicating fee for distributed reprints.

NOTES:

Each exam will contain approximately 20-30 objective-type questions and a one two-page essay, with a choice of topics offered. The exams will be based primarily on class lectures, reading assignments, and class handouts. Use the extensive Glossary on pages 571-581 of the text, as these will help you on parts of the exams.

Many of the lecture notes are available for your review in the Reserve Room of the CSUF library. Your final grade will be determined by the three scheduled examinations, each contributing one-third to the final grade. Attendance at each lecture can make a critical difference.

Make-up exams are possible in extreme cases, but will consist of elaborate, extensive essays only. Projects for extra credit are encouraged and will be discussed in class.

Numerous texts, journals, and articles are available for your use in my office and in the CSUF library. They are strongly recommended as reading assignments.

ENJOY THE COURSE!

→ 11:30 lunch w/ SLC IRVW 11
→ ~~11:30~~

SYLLABUS

<u>WEEK</u>	<u>TOPIC</u>	<u>READINGS</u>
1 SEPT.	Overview of Biological Anthropology Fitting into the big picture Developing an evolutionary perspective	Nelson, Chs. 1-3
8 SEPT.	Evolution in Anthropological perspective: The fossil record, techniques of fossil dating, limitations, and pitfalls: taxonomic considerations	Nelson, Chs. 8: pp. 374-378; 561-569
15 SEPT.	Mechanisms of evolution, DNA, chromosome analysis- techniques and interpretations: contributions of Darwin, Wallace, and Mendel	Nelson, Ch. 4
22 SEPT.	The primate order: Primate evolution, the living primates, relationship to human evolution, implications for modern <u>Homo sapiens</u> , relics of a related past.	Nelson, Ch. 11
29 SEPT.	The primate order (continued): Modern primates, behavior and life style, reproductive strategies	Nelson, Chs. 9, 10
6 OCT.	<u>EXAM #1 - BRING A PEN!</u> Early Hominids: What is human? (Not so easy to define) Ramapithecus: Hominid? Hominoid? Neither?	Nelson, Chs. 12, 13
13 OCT.	Early Hominids (continued): Australopithecines, sources of heated controversy. What are the issues? How do recent finds clarify as well as confuse the problems? What have we learned in the 50 years since the Taungs discovery? (see display case opposite McCarthy 177) Lab demonstration: Osteological variations	Nelson, Chs. 14, 15
20 OCT.	Early Hominids and humans: <u>Homo erectus</u> , Neanderthal. Where do they fit into our human heritage? How much of popular concepts are acceptable? How many are barely compatible with the fossil record? Lab demonstration: Osteological variations	Nelson, Chs. 16, 17
27 OCT.	Early humans (continued) CroMagnon: Hunters and gatherers under the best of conditions. Evolutionary consequences of the hunting-gathering way of life: To what is modern <u>Homo sapiens</u> really adapted? Emergence of agriculture, consequences for human evolution, end of prehistory	Nelson, pp. 547-551
3 NOV.	<u>EXAM #2</u> Human adaptation and variation, climate, and altitude demands, adaptive characteristics, geographical patterns	Nelson, Ch. 6

- 10 NOV. Organizing the facts of human variation and diversity, human intelligence, misuse of the I.Q. tests, interactions of nutrition, and human development. What does "lactose intolerance" mean? What are the implications? Nelson, Ch. 7
- 17 NOV. Modern human populations: Micro-evolution, blood groups and hemoglobin variations, interactions with human diseases, relationship between malaria and sickle cell anemia Nelson, Ch. 5
- 24 NOV. Modern human populations (continued): Human skin pigmentation, interactions, between climate, environment, nutrition, and genetics; dermatoglyphics - a close-up view of one human variation with laboratory demonstration Nelson, pp. 547-550; 561-569
- 1 DEC. Human health and disease: Interactions between culture, human reproduction, and social factors. Laboratory demonstration of family planning devices Review prior relevant readings
- 8 DEC. CATCH-UP AND REVIEW
- 15 DEC. FINAL EXAM - SEE CLASS SCHEDULE BOOKLET, ALSO CLASS ANNOUNCEMENT

①

1/4 -

Adaptation + Variation w/ Humans

→ measure of fitness & - adaptability - surviving population

(+ reproducing + growing)
survival rate.

because mammals - able to adapt to
wide variety of conditions -
physiology / technological

(stretched out)

- (lived - large - heavy - relatively hairless) -
sweaty → basic body description

adapted to env. -

(dry wet dry cold
wet wet wet cold)

① changes - body size

② " " " shape

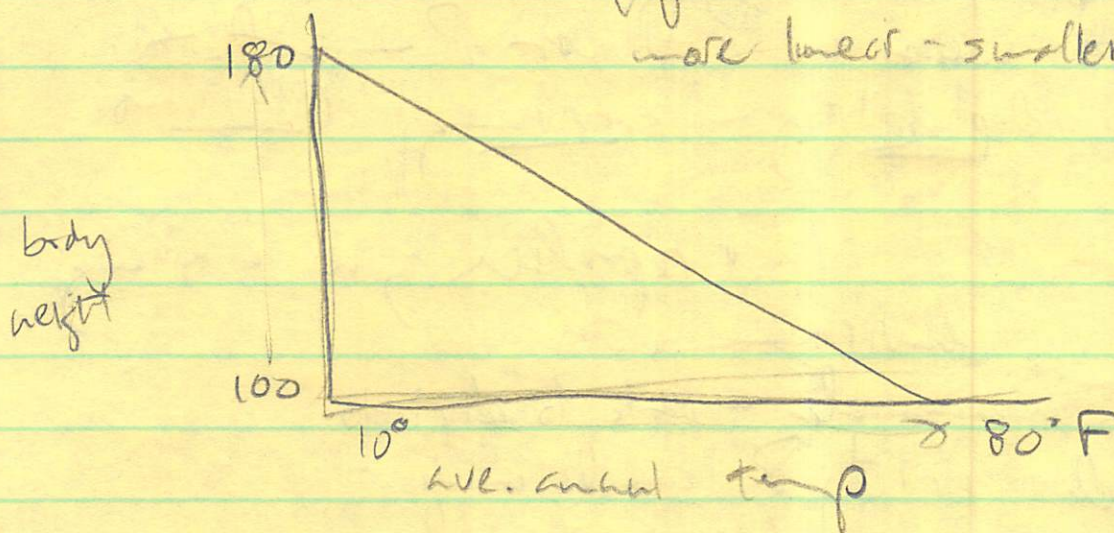
③ certain physiological changes.

Bergmann (Naturalist) - ^{all mammals} body size in
mammals that have been in env x for given time
size decreases as temp increases.

(2)

Human pop. studied - Roberts -


116 different populations - water climate
more humid - smaller



Allen - looked at extremities (arms, legs)

- cold climates - shorter extremities -
- hot " - longer "

Arctic environment - Siberia, Finland several
thousand years → stocky, short extremities

circle less contact
w/ outer environment than → 
more protected inner core

(brain - heart - lung - kidneys - stomach)
extremities sacrificed to protect inner core
Homeostasis - physiological functions utilized
to survive.

⑧

105+ death
104 brain suffers
99° sick

98.6°F (37°C)

95° hypothermia (low-temp)

? baseline?

High temps - tall, long extremities -

one basic mechanism - to sweat, all

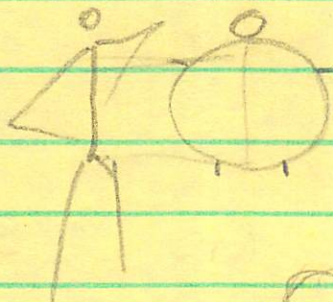
humans have basically the same

number of sweat glands per sq. inch.

to get more sweat glands - longer body

to offer more skin to env.

~~height~~ length of spinal column very little
variation - height = length of legs.



active person in hot dry climate = 2 gals. of

water a day - sweat function

intense stress → 2 liters of sweat.

heat stroke = sweat malfunction - body
temp. (core) rises.

(4)

every human = 2 mill sweat glands

to increase body temp
↓

- exercise.
- muscular activity for internal heat = shivering
- chill - goose bumps - hair follicles stimulation
hair pops up
- diet -

University of Colorado Scientists Study Effects of Altitude Upon Humans and Animals

Rocky Mountain High Creates Special Problems

By JENNIFER PARMELEE, Associated Press

LEADVILLE, Colo.—Up here, in the nation's highest incorporated city, cakes rise startlingly fast, chickens have trouble laying eggs and cars often sputter to a halt in the clean but thin air.

Humans, too, are affected by the altitude. Visitors to this town at 10,500 feet find themselves breathing faster—and thinking slower.

For the same reason—the fact that the flow of oxygen to the brain decreases at higher altitudes—one or two stiff drinks at these heights can put a newcomer under the table.

"The adage is that a three-martini person at sea level is a two-martini person in Denver (one mile high) and a one-martini person at Leadville," said Dr. Robert Grover, who has studied the effect of altitude on humans for years at the University of Colorado Health Sciences in Denver.

Beyond the Obvious

Any experienced skier or mountain climber can describe the difficulties of working or thinking where the mountains soar to meet the sky. But researchers like Grover have gone beyond the obvious.

One recent CU study here, for instance, indicated that women living in Leadville would be likely to deliver a baby about a pound lighter than his sea-level counterpart.

There are unexpected benefits too.

Although performing any sort of work up here is more exhausting because there is less oxygen to breathe, initially working the heart more, studies show that living in mountain towns actually decreases the likelihood of heart attacks.

The CU cardiopulmonary laboratory has become the unofficial brain center for high-altitude research, attracting specialists in the field from all over the world.

Easily Accessible

This is hardly surprising. More than half of Colorado lies above a mile high and "natural laboratories" like Leadville are easily accessible.

Researchers have studied everything from the relatively simple "mountain sickness" to more complex afflictions such as pulmonary edema to still mysterious phenomena such as the "natural high."

"I used to climb 14,000-foot peaks quite often," Grover said. "Frequently, something would set you off, making you uproariously happy and subject to inappropriate behavior, the natural high as it were."

"I've got some pictures of people just roaring with laughter," he adds. "It's very much like being slightly drunk."

People react to altitude in different ways.

ent ways.

"Millions of people come to Colorado each year from sea level and perform strenuous exercise such as skiing and hiking," says CU researcher Jack Reeves. "Very few of them develop serious complications like pulmonary edema (a potentially lethal disease that fills the lungs with fluid)."

About half of all people traveling to 7,000 feet from sea level will experience vague discomfort such as lightheadedness, nausea and insomnia, he says.

A climber at 14,000 feet will experience some form of mountain sickness in about nine cases out of 10, Reeves adds, with severe symptoms such as hemorrhaging from the eyes and fainting spells becoming more common.

Turn-of-the-century scientist J.S. Haldane, quoted in the book "Going High" by altitude specialist Dr. Charles Houston, described a visit to Colorado's 14,100-foot Pikes Peak.

"The walkers struggled in one by one looking blue, cold, exhausted and miserable, often hurrying out again to vomit. Some lay on the floor blue and faint. Others were able to swallow some coffee, but very few had the heart to look at the magnificent sunrise."

A person's capacity to work declines about 3% for every 1,000 feet up, scientists say, which means

at 16,000 feet, a visitor can do about half the work he could at sea level.

In addition, as oxygen decreases to the brain, thought and judgment become impaired.

"Altitude saps the strength and will, but even worse—it weakens our most important mental functions," Houston wrote.

One Leadville accountant said he has to go down to Denver to balance his books. A British businessman who lived in La Paz, Bolivia, would call a cab and 15 minutes later, when the cabbie arrived and said, "Where to?" he frequently couldn't remember.

U.S. Army tests found troops practicing atop 14,000-foot mountains were short on teamwork and long on mistakes.

'Roof of the World'

Yet in Nepal, "roof of the world," populated valleys are higher than the mountains of most other countries, with an average elevation of 16,000 feet.

One key is adaptation, although even that has its limits. Houston said there are no known permanently inhabited villages in this world above 17,500 feet.

The famed Sherpa guides of the Himalayas are a striking example of how man adapts to altitude. Grover described watching young Sherpas climb approaches to

huge loads on their backs, "singing and whistling as if there were nothing there."

Another example of high-altitude training is the Leadville high school cross-country team, which has won the state title nine times in the past 12 years.

More Red Cells

One reason for this is the body eventually adapts to altitude by producing more red blood cells, translating into a greater capacity to carry oxygen, important for endurance sports.

This rich blood is great for blood banks. But its consistency, likened to "frozen malt" by one doctor, can slow the transport of oxygen, prompting headaches, shortness of breath and grogginess. Many Leadville residents, mostly middle-age men, suffer from this chronic mountain sickness and must get their blood "thinned" regularly.

Women in Leadville are not stricken with chronic mountain sickness as often. But their offspring average about a pound lighter than sea-level babies. It is not yet known whether they grow up to be smaller adults.

CU's Dr. Lorna Moore said studies in Leadville, and more recently in 14,200-foot Cerro de Pasco, Peru, had similar findings. Pregnant mothers who responded to altitude

by breathing less frequently were apt to have smaller babies than those who breathed more, getting more oxygen to the fetus.

This is critical, she said, because the smaller the baby, the smaller its chances for survival. In Cerro de Pasco, the average infant weighs in at 6 pounds, only a half-pound over what is considered a "high-risk" baby, she said.

This phenomenon is echoed in the animal world. Robert Moreng, an animal science professor at Colorado State, said hens have a hard time breathing at a high altitude, reducing their ability to lay an egg that will hatch. Above 10,000 feet, he said, it's virtually impossible for a fowl egg to hatch.

The good news about altitude, medically speaking, is its apparently positive effect on heart troubles.

After a few weeks at altitude, the amount of blood pumped by the heart is cut by up to 20% while the number of blood vessels increases. This relieves stress on the heart, "which may be how altitude protects people from heart attacks," Grover said.

Just as people and animals are affected by altitude, so are machines. A mechanic at Coldfoot Car Repairs in Leadville said a car tuned at sea level will lose 75% of its power at 10,500 feet. And: "No matter how you tune it up here, it's never going to reach 100%."

①

11/18/86

→ I.Q. testing discussed last week.

Intelligence/learning capacity → nutrition -

85% braincell lost trimester 4 1st year

& ~~was~~ - no more made (hid down) after that - heavily influenced by nutrition.

Hunger → receptors in the stomach & activity

& hypothalamus (brain stem) - sensitivity to glucose levels -

true to all mammals - humans

→ way of eating - patterns of eating different in ea. culture - 2

eg. hunter/gatherers - kill-eat (mobile) during prep'g food all day affair -

3 sq. meals = idea of the industrial revolution factory work away from home.

(2)

many cultures have taboos toward what
one should/shouldn't eat. halal/halal food
(eg - "Kash don't eat quiche.")

→ many soc. men & women don't eat
together -

human hist = search for food →

vs. weather (storms, drought, etc), social
upward (wars, etc.) → results in

famine → malnutrition - lack
& nutrients.

resistance to diseases caused by
extreme famine → fam becomes
a killer.

Famine → human reaction = move
(migration) - eg. Arabs moved under
unhindered or German migration to
northern Italy, potato famine in Ireland

search for food → migration & political
struggles.

(every 10 yrs - famine in pre-Rev. Russia
& China "bread & land".)

Industrialized countries famine is
rare (eg. WWII - Holland surrounded
by Nazis = people starved to death).

not much starving ~~by~~ but mal-
nutrition. ~~poor diet~~ = poor eating

mal-nutrition:

social ~~and~~ political economic (ignorance)

eg -

S. African tribe & Bantu tribe; before
colonisation - cattle people - milk & milk
products - work tool (for harvesting corn
etc.) - ritual feasts (lots of meat).
→ Europeans took lands - converted to
sharecroppers - things go down hill -

eat everything
sheep raise land - convert to cash
crop economy - import food stuffs -
loss of self-sufficiency - grow crops for
cash (export) import food canned foods,
soft drinks, liquor, cigarettes etc!
MALNUTRITION
2 pregnancies → for 2 surviving children
to reach adulthood - 8 die before
during birth.

hardship - solution - social-political economic
absence of energy classes/nutrients

lack of protein

Kwashiorkor (Ghana - "2nd child disease") -
weaning food washed food - no protein sources
protein deficiency - because 2nd child
is removed from breast to make way for
new-born - no milk / no protein
cultural/religious food regulations - what infants
eat / pregnant women etc ...
taboos re: certain products
not not appropriate for women to eat - universal
belief.

⑤ distribution of food - culprit for poor health
in various "plucky" regions.
Changes in Soc & nutrition & diet
eg Japan after WWII -

98% pop w/ refriger → milk & prod
prominent part of diet.
spurt of growth → elementary
school desks raised 2x
official door height raised 1".

Intro of milk

Vitamin
RDA = minimum dietary requirements
RDA = recommended allowance.
What they do where they were etc.

① A - retinol - eyes occurs in all colored veg & fruit
oranges - fruit
yellows - carrots, sweet potatoes,
squash, egg yolk

→ Supplements in milk product
fat soluble (can be stored in fat
supplies) Δ can o.d. on

w/o A → 1st sym: eyes wouldn't
light diff - would it see in twilight
cont → blindness.

water soluble ⑥

B - complex

Thiamine → lacks in grains (eg. rice) ^{lost - over} produced rice - white rice.
supplemented in most
foods - in industrial nations

Thiamine -

w/o → beriberi, ("I can't") - damages
nervous system - connect. wires → ~~loss~~ loss
of use of hands + feet (Thailand/
Malaysia) → cont. = death

Niacine - corn (corn-mead) present but not readily
accessible
southern diet - 3 in - mead (corn-mead), molasses,
meat

w/o

6,000 deaths a year 'til 1930's - pellagra -
Italian "sour skin" - charred look
skin - stomache - dementia - death

4 Ds → dermatitis - diarrhea - " "

pot liquor - w/ niacine → black sopped up -
white wouldn't - blacks
w/ pellagra

maize → corn used in tortilla → soak ~~the~~ kernels
in calcium carbide to soften kernels - released
niacine to be used.

⑦

C - ascorbic acid - widely distributed (oranges - every green veg., even things

water soluble -
Few months supply in the liver.
→ very restrictive diets → crackers + water
w/o scurvy
see Wyszynski
lost teeth, hemorrhaging, nerve damage

blood clotting, nerve damage, collagen of teeth

British Doctor → Linn - before better

~~water~~ waterloo - divided navy up to determine
scurvy cause → lime (actually lemons)
was key $\frac{1}{4}$ lime a day - linn

controversy re: mexico does - theory re:

human evolution: once self produced Δ

C = less cold, sicknesses - but more

C more work for the kidneys. No agreement

⑧

D

Fat soluble - not present in most
food we eat. Occurs - active in
cod liver oil a little in egg yolks,
large numbers in polar bear liver (but
toxic), → Sunlight on skin →
hydrochloride → becomes D

A + D add to milk (products).

w/o D → rickets bends bones -
critical to females pelvis region - dangerous pregnancy.
older people → osteoporosis - softening of
bones
cultural restrictions → purdah women
completely covered

11/18

-- I.Q testing discussed last week.

Intelligence/learning capacity --- nutrition related. %85 brain cells laid down during the last trimester of gestation and first year of life - heavily influenced by nutrition.

Hunger:

receptors in the stomach and activity of the hypothalamus (brain stem) - sensitivity to glucose levels - true to all mammals (eg., humans). But the ways or patterns of eating is culturally determined. Eg., hunter/gatherer cultures eat when they've gotten a kill (undetermined period), eat (nibble) during food preparation. An all day affair. 3 square meals a day is an idea of the industrial revolution - factory worker away from the home.

Many cultures have taboos toward what one should/shouldn't eat. Eg., Male/female foods, "real men don't eat quiche." --- many societies men and women don't eat together; human history = search for food; vs. weather (storms, drought, etc.) social upheaval (wars, etc.) --- results in famines, technical term: Marasmus - lack of nutrients.

Resistance to diseases lessened with extreme famine - flu becomes a killer. famine --- human reaction - move (migration). Search for food and political struggles and migration. 1 every 10 years (famines) prior to revolution in Russia; "Bread & Land" slogan of the revolution. In industrialized countries famine is rare (except in war--- WWII - Holland surrounded by Nazis and people starved to death). Industrial countries not much starvation but malnutrition. Poor eating.

Changes are generated for these reasons: social, political, economic. Eg., South African Bantu tribe; before colonialism were a cattle-people - milk and milk-products - work tool (for harvesting corn, etc.) - ritual feasts (lots of meat); Europeans took lands - Bantu converted to share-croppers - i.e., growing what sells but not necessarily what they can live on; British solution -- become sheep herders. Sheep rape the land (eat grass down to the roots vs. cattle who are blade nibblers) --- land/people convert to cash crop economy - import food stuffs - loss of self-sufficiency grow crops for cash (export) import food, canned foods, soft drinks, liquor, cigarettes, etc. MALNUTRITION . . . for 2 surviving children to reach adulthood, 8 children have to be born. Trouble was that the solution was social-political-economic but not nutritional.

Kwashiorkor - lack of protein (Ghana - "2nd child disease") , when mother has a second child and must wean the first child from her breast the first child's diet which was high in protein (mother's milk) is substituted for mashed foods (sweet potatoes, etc.) no protein sources, protein deficiency. Cultural/religious food regulation - what infants /pregnant women may eat . . . more taboos ("meat is not appropriate for women to eat." Distribution of food is the culprit for poor health in various "plentiful" regions (eg., the Philippines). Changes in society re: nutrition and diet --- eg., Japan after WWII - 98% pop with refrigeration - milk and milk products now a prominent part of diet - spurt of growth among the Japanese - elementary school desks removed twice; official door height raised 1 inch.

VITAMINS

A --- retinal - eyes - occurs in all colored vegs and fruits (oranges, carrots, sweet potatoes, squash, egg yolk) supplements in milk products - fat soluble (can be stored in fat supplies) therefore can be toxic if over used. without A - 1st sym., eyes wouldn't adjust to differences of light - can't see in twilight ---- eventually resulting in blindness.

B - COMPLEX

Thiamine - husks in grains (eg., rice) which is lost in over produced "white rice". In Industrial nations it's supplemented in most foods. without results in Beriberi ("I can't") - damages nerve endings - connections loss of use of hands and feet, eventually resulting in death.

Niacine - corn (corn-meal) present but not readily accessible to the body. Southern diet --- the 3 M's - meal (corn meal), molassis, and meat. without results in Pellegra; Italian for "sour skin" - chard looking skin. The 4 D's: dermatitis, diarrhea, dementia, death. 6,000 died a year prior to 1930's; but not as many in the black community because they would eat the pot liquor of the corn meal and the white community wouldn't - something in the pot liquor made the niacine in the corn meal accessible to the body. Same is true with the Indian diet of Maise - corn used in tortillas - soaked kernels in a calcium carbinat to soften them before pounding it into a powder - released niacine to be used by the body (the calcium carbinat solution).

C - Ascorbic Acid - widely distributed (oranges, every green veg., ~~even fish~~ some present in french fries!!!). Water soluble; few month supply the liver - only not ~~the available~~ available in very strict (restricted) diets), eg., water and crackers. Without - scurvy --- loss of teeth, hemoraging, nerve damage, blood clotting, collagen of the ~~teeth~~ teeth; Brittish doctor, Linn - before the battle of Waterloo - divided the Navy up to determine what caused scurvy --- those that had access to lemons (called Limes by the brits) was the key - 1/4 a lemon (lime) a day. Too much tough on kidneys.

Controversy over megadoses - theory re: human evolution; once ~~the~~ self produced natural vitamin C, thus less colds and sickness; so more megadoses of C will greatly reduce sickness. But the more taken the more the kidneys have to work. No agreement.

4/25

lost of the world - $\frac{1}{4}$ nutrients go to ^{parasites} worms } in the
intestinal tract -

protein - animal products
cereal products \rightarrow enough } ^{difficult} Kwashiorkor

protein - calories \rightarrow difficult = marasmus
everything

A retinol orange-yellow vegetable
night blindness
Xerophthalmia - total irreversible
blindness

B - Niacine - corn - soak kernels in lime water
pellagra - 1 ^{killer} till 1930's

B - Thiamine - rice - cereal husks
 \rightarrow beriberi

C - Ascorbic Acid \rightarrow no @ \rightarrow scurvy
 $\frac{1}{4}$ orange a day - same ^{stored} $\frac{1}{4}$ in the liver

(2)

D - very complex - controls calcium levels -

w/o D = ^①rickets children
bends bones (eg. pelvis)

② adults - osteoporosis } menopausal
osteomalacia } women
brittle bones

→ Fish livers
→ sunlight

fat soluble - can be toxic w excess

Milk

priority domestication (8,000) mother's milk only source
of milk (see protein) - strong selection
toward ability for infant to be able to digest
mother's milk - if not → = death (no alternative)
↓ herd animals
selected to strengthen muscles/bone

human infants → already helpless at birth -
able to suckle, cry, excrete, little grasping.
→ protein → brain development

Human milk

	Human	
Lactose content	7.5	per hundred mill.
Cow	4.5	
Reindeer	2.5	
Seal		

highest lactose level

(3)

all human infants can (must) digest lactose
via lactase (enzyme)

↓
lactose (double sugar)
↙ ↘
galactose / glucose

w/ animal domestication - (8,000) - ability
to digest milk as humans would be
advantageous also - good food - could be
selected for following domestication.

↓
but most culture - have difficulty of
breaking down lactose Δ ~~most~~ prep
milk \rightarrow cheese, sour, ferment - to break down
lactose to glucose & galactose.

test of adults ability to digest lactose
reveal cultural association w/ cattle eg.

Africans central europeans vs. Asians, ^{pigs} ^{pigs}
have no ~~association~~ association w/ cattle -

(4)

Skin

an organ - important

16 - 18% total body weight = skin

- very effective boundary

- water proof

- structure

- sense organ

- maintaining temp. interaction.

- work with

- protective protection -

adaptation to various environment

normal skin = 40% total body water

2 main parts - epidermis - heavy layer folded over cutis

(cutis)

base of epidermal cell \rightarrow granules contain

melanin - ^{contained in} melanocyte (see #)

in most humans regardless of pigmentation

tyrosine \rightarrow tyrosinase (enzyme) - 6 gene hereditary

albinism - no tyrosinase - ~~no~~ more melanin
in each melanocyte

(5)

function of melanin - protection vs.

① skin burn - short wave light - not serious unless effects sweat glands (regulation of skin temp damaged).

② 70 hydroxysteroid - within skin producing vitamin D.

over deposit of "D" = excess deposit of calcium of soft tissues of the body - eg. kidney calcium deposit.

amount needed of vitamin "D" ^{international units} 400 I.U. to fight rickets → how do you get 400 I.U.?

eg. England (north
venice → 3 sq. inch 3 hrs a day) -
total body exposure @ equator for 1 hr =

120,000 I.U. (European - white = 800,000 I.U.)

toxic about 100,000 I.U. - plentiful tyrosinase (dark skin) from both parents blocks all but 5% of sun's rays = bring down 800,000 to 400 I.U.'s

②

Western regions less cover - balance ~~between~~
under/over exposure.

hair type - eye color etc.

12/2

①

pigment A₁ → Vitamin D level - controlling
calcium level

inadequate Vit. "D" → rickets.

→ calcium deposits.

precursor → Vit. "D" → lower level

skin produces ↓

Diet better than pills -

can easily D.D. on "D" -

Blood groups - ABO system

Substances present on every body cell - antigens
(which produce antibodies) - part of

the immunological system → vs. "foreign
bodies" (bacteria, viruses, splinter, etc.)

ABO studied 1900 - by Carl Landsteiner - made
successful blood transfusions

1490 Pope & young blood - 3 boys die ...

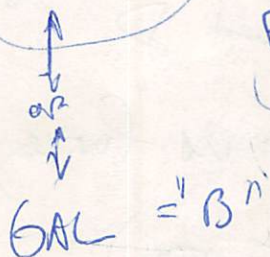
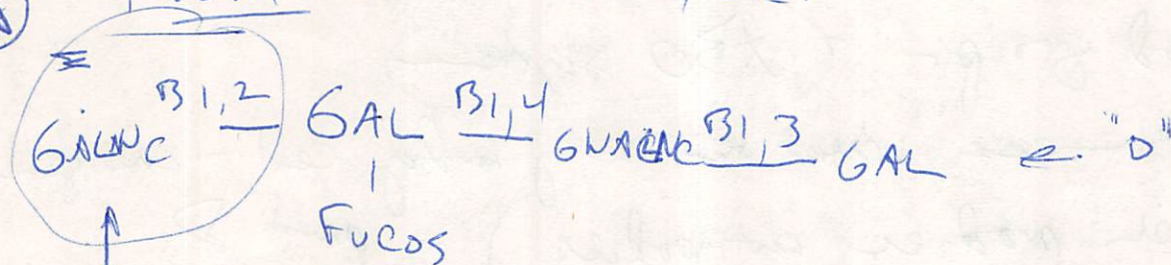
②

Recipient \rightarrow Donor
 O \leftarrow O [anything else (A, B) will be fatal]

A \rightarrow OA
 B \rightarrow OB
 AB \rightarrow AB, O, A, B

better to be "O" - more primed to produce
 Antibodies - sense more things to react to/agent
 "A", "B", "AB" \in present in all living
 matter: air/food/etc.

③



inheritance

♂	♀		♀	♂	
	A	B		A	O
O	AO	BO	B	AB	BO
	AO	BO		O	AO

AB 25%
 B 25%
 A 25%
 O 25%

③

old distribution of ABO blood groups.

40-50% = "O"

30-40% = "A"

20-30% = "B"

<5% = "AB"

→ Native Americans (South/North)
100% "O" - move east
through Asia goes to "A" -
mixture of blood types in
Europe & Africa.

♀ "OO"
♂ "AO"

child

"AO"

→ "OO" mother's antibody system
may attack & destroy the "AO"
baby - lower fertilization
rate

"O" mother +
anything but "O" Father

break in placenta

5-20% pregnancies
lost through spontaneous
abortion. If child is born possible

ABO incompatibility → ~~very rare~~ even if

Anti-"A" cells destroying self & because
of the "A" cells from father →

breakdown of hemoglobin in blood (free
hemoglobin) producing toxic substance called
bilirubin. Fatal if level of bilirubin get too high &
to the brain → jaundiced looking - partial

transfusions to the baby (eliminate anti-A cells)
 theoretically "A" & "B" should have been
 selected against - unless environment
 intervenes making "A" or "B" advantageous.

Rh Factor

Rhesus monkeys

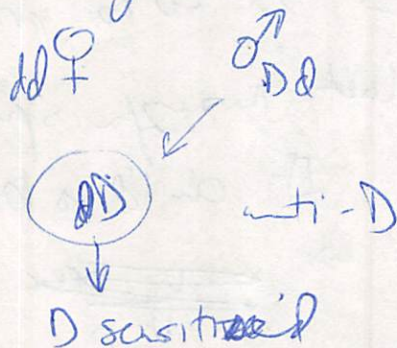
6 possible genes
 plus or minus
 Refers to "D" section

C	D	E
c	d	e

→ d basic section - recognized D as foreign etc.

only 15% rh- in world wide scale

rh-



Sickle Cell Anemia -

disease condition that is beneficial because
S - S disease condition

disease of the hemoglobin - w/ i
red blood cells \rightarrow hemoglobin \rightarrow function
to grab O_2 in the lungs & deposit it
in the heart

Hgb A \leftarrow normal A = Adult

Hgb S = altered hemoglobin - 1 different
first in amino acid chain

Val his leu thr pro glu glu ...

" " " " " val glu ...



eg

heterozygous

	A	S
A	AA	AS
S	AS	SS

USA USA

90% \leftarrow AS \rightarrow 40%
14% \leftarrow SS \rightarrow 4%

thick blood flow
in tiny capillaries
Africa

why does gene persist? - malaria, on worldwide
scale, major killer! disease of the red blood cells.

④

vector = disease transmitted by carrier

Anopheles gambiae - malaria

protozoa twilight/dawn birds

man
↓
bite → 100
(1 hr)
↓
liver
(1,600,000)
1 week



↓
to red blood cells

160,000
(1 week)

↓
burst rbc

Free high bilirubin - very sick!
wrecks temperature regulation

5 mill rbc in
cubic cm.

↓
of rbc incredible

lost 20% rbc
continues (10 yrs)

produce Δ numbers kept down.
in underdeveloped area

has network

sexual reproduction
in human
↓
sexual reproduction in mosquito

rash on skin etc.
get very sick but not fatal

response - if

some anti-bodies

everyone

⑦

AS → malawi doesn't do as well; numbers
kept down of mal. protozoa

12/9/86

phys with

(1)

(dermatoglyphics/demography.)

- ~~side~~ side cell membrane.
- whorl pattern
- vector \rightarrow type S mosquito
- malaria cycle
- ABO - AO = "A" phenotype

D \rightarrow natural selection alone
A/B/AB unknown influence.

IQ test - poor test, don't reveal much
about a person - just tell how
an individual will

Cecil Burke

$$\frac{\text{mental age}}{\text{chronological age}} \times 100 = IQ$$

②

melanin - tyrosinase → tyrosine =

[most of melanin
in skin.]

endemic → present all the time

Dermatoglyphics - study of skin

fingerprints/palms & the hands.

- feet - tips of fingers
- palms - tips of toes

unique - 12th week gestation
but only three basic types



ulnar loop - little finger
radial loop - thumb



③

arch = 0 pts.; 1 per ring & loop
1 per ring & whirl (wheel
starting w/ higher

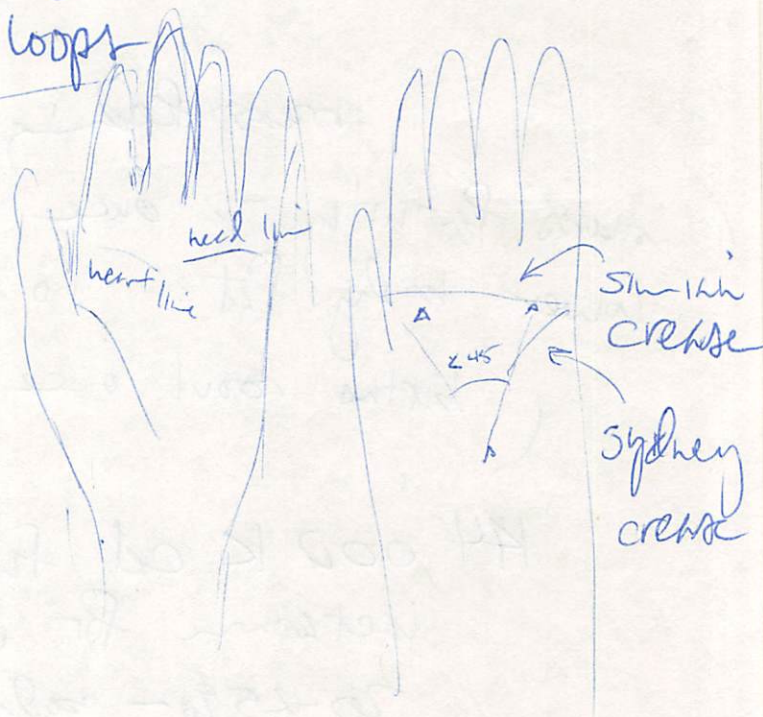
all ten fingers =

145 points man
127 woman

down syndrome

high number & odd ...

all whorl loops



turner syndrome (females)
sterile.
higher # & points

Klinefelters (males)

ATD angle greater

XXY - 112 points lower (normal) than 45°
(60-80°)

Schizophrenic → loops w/ open spots

(4)

Demography

- Increase in # of human beings.

RTE \Rightarrow 70% = # of human double every 35 yrs.

5 million ⁰⁰⁰ "human" from 8 to 10,000 years ago

(~~Protein & Disease~~ accidents) no one gran old ¹⁵⁰

- Neanderthal 50 max

- Australopithec 40 max

breast feeding patterns influence

(natural fertility \rightarrow once every 15 minutes for a minute
lower body fat - no ovulation ...)

(births about once every 4 yrs.)

144,000 kcal full term pregnancy + 3 months lactation for women.

(20-25% - body weight = fat - females
15-18% - " " " - males)

amenorrhea \rightarrow no period due to low fat = body weight ...

5 ~~million~~ ^{million} people
8,000 years ago (BC) ⑤
w/ agriculture → 1 baby a year pattern
begins.



300 million at AD 1 - time of Christ



1 Billion 1800

2 Billion 1900

3 Billion 1950

4 Billion 1975

5 ~~Billion~~ ⁱⁿ ... approaching

} Spurt of growth in
0.02 course of human
existence.

of 5 Billion

- 1 bill. go hungry
- 40,000 child die each day
- 2 mill teenage preg. (10-12 yr.)
- 55 mill preg term w/ abortions.

Birth Control - fertility

①

→ ~~noting~~ as effective as ^{lactation} breastfeeding method -

Hutterites → average 10 births per married women

Industrial countries

where birth control used very little diff between
Cath/Prot. (abortion/the pill)

IUD - infection via string

diaphragm -

→ spermicidal jelly → irritation - to women -

sponges - lots of infections birth occurred w/ defective child - known

the pill → estrogens - 99% effective

- water retention

- breast size increase

- yellowish use - "liver" spot - skin

- reduce menstrual flow

- fear of upsetting bio-chemistry.

Depo Provera - injection - hormonal

1/5 years AIDS - worse than heart disease - cancer.

56,000 deaths for both the

HEALTHFUL HINTS



CALIFORNIA STATE UNIVERSITY, FULLERTON - STUDENT HEALTH AND COUNSELING 773-2800

VOLUME 6, NUMBER 3

NOVEMBER, 1986

STUDENT HEALTH & COUNSELING CENTER HOURS:

Monday-Thursday 7:30 a.m.-4:30 p.m.
Urgent Care 11:30 a.m.-1:00 p.m.
Friday 7:30 a.m.-11:30 a.m.

Come to WALK-IN CLINIC or make an appointment for your health care. Services at the Health Center are basically free. Why not take advantage of this service provided for your convenience? You can't beat the cost!

FREE MEASLE/RUBELLA IMMUNIZATION

Monday thru Friday. All students are urged to get their vaccination. This service is free and only takes a few minutes.

TUBERCULIN TESTING (TB)

Available Monday thru Wednesday, no appointment needed. Call for more information, or come to the Health Center.

CPR CLASS WILL BE HELD IN THE HEALTH CENTER CONFERENCE ROOM 206

Friday, Nov. 21 from 8:00 a.m. to 12:00 noon. Advanced registration is required at the Reception Desk. This is a four-hour certification or recertification course. This is a free service.

BIRTH CONTROL CLINIC—STUDENT HEALTH CENTER

Any student wanting to use the Birth Control Clinic are strongly encouraged to attend a 45-minute orientation. The session includes a film and discussion on various birth control methods and sexually transmitted diseases. Health Conference Room 206.

TUESDAY NOV. 18 1-2 p.m.

HEALTH PROMOTIONAL LECTURE SERIES—WEDNESDAYS

Sponsored by Student Health Center and The Women's Center, 12 noon to 1:00 p.m., MH-33 (McCarthy Hall)

CONTRACEPTION AND UPDATE ON CHLAMYDIA—NOVEMBER 12th

Mary Morahan-Naples, M.S.W., Birth Control Counselor, SHCC. What is contraception? It's a choice instead of chance and you have a choice. There are many safe, practical and effective methods of contraception available. Chlamydia is a sexually transmitted disease and is on the rise. Awareness and effective therapeutic regimens will help to control the increase in this disease.

DO'S AND DON'TS ABOUT SKIN CARE—NOVEMBER 19th

Frances Segal, M.D., Dermatologist, SHCC. Routine health skin care dealing with cosmetics, sunscreens, blemishes and wrinkles. What about products that promise to "freshen" your skin, shrink your pores, and turn your complexion plump and rosy?

We would like to welcome Dr. Segal, our new consulting dermatologist, to CSUF and the Student Health and Counseling Center.

WHAT'S NEW ON THE GRAPEVINE?

Gossip, why do we do it? One way to understand why people gossip is to look at the feelings that result from gossiping. Gossip involves the sharing of information between people. We feel closer, more intimate, with the person who is sharing "privileged" information with us. Gossipers often feel an increased sense of self-esteem and self-importance. They feel superior to the person they are gossiping about as they secretly pass judgment on that person's behavior and character. Having information others do not makes one feel powerful, as does deciding with whom to share the knowledge.

Who is "in" and who is "out" can be determined, in part, by who knows what about whom. A person may also feel vindicated by gossiping about someone who has hurt him or her in the past. Gossip continues because it meets people's needs for self-esteem, intimacy, group membership, and maintaining group norms. Unfortunately, malicious gossip leaves the gossiper feeling guilty and the person being talked about feeling hurt and angry. The next time you are tempted to gossip, ask yourself what your own need is to participate in gossip and how you'd feel about being on the receiving end. Being known as a person who doesn't gossip may cut you out of the grapevine, but it will also earn you the trust and respect of others.

(WELL, WELL, WELL, Student Health Service of The Claremont Colleges, December, 1985)

ARE YOU EXPERIENCING THE WINTER BLAHS?

In 1984 a new syndrome was identified by psychiatric researchers at the National Institute of Mental Health (NIMH). Its victims, called "winter depressives," gain weight, lose their libido, need more and more sleep, find it harder to get to work and finally become depressed and withdrawn during the winter months. While typically depressed people usually wake up early, winter depressives often sleep nine to ten hours a night, wake up tired, take naps and have a 50% reduction in delta sleep. NIMH studies point to sunlight (or the lack of it) as the culprit. (There are actually six fewer hours of sunlight on December 21st compared to June 21st.) Winter depressives who were subjected to artificial light 20 times more intense than normal indoor lighting experienced measurable mood changes. Intense lighting to replace the lack of winter sunlight seems to ease the symptoms, says MD magazine.

(AMERICAN FAMILY PRACTICE, April, 1984)

DRINKING DAILY GLASSES OF MILK MAY PROTECT AGAINST COLORECTAL CANCER

Not an apple a day, but two or three glasses of milk a day may provide protection against the development of colorectal cancer. According to a study done by Dr. Cedric Garland, of UC San Diego, persons diagnosed with colorectal cancer had a low intake of calcium and vitamin D. These persons had nearly three times the colorectal cancer risk than those who drank two glasses a day. The study doesn't prove that dietary calcium and vitamin D may help prevent colorectal cancer, but it does help establish an association between calcium/vitamin D and colorectal cancer, according to the researcher. Although the preventive effect has yet to be proved, Dr. Garland suggest drinking two to three glasses a day of nonfat, vitamin D fortified milk as a safe intervention against colorectal cancer. However, he warns against taking vitamin D supplements, as large doses can be toxic.

(FACT PAK FOR PHARMACIST, June, 1985)

INTER-CAMPUS HEALTH CARE

The Trustee policy on Student Health Services approved a change in September, 1984. The revised policy states: "Students eligible for basic services at one CSU campus shall be eligible for basic services provided by other CSU campuses at no additional cost." So, if you are in another part of the state, near a CSU campus and have need of health care, you may go to their Health Center.

TESTICULAR CANCER SELF-TEST

Only 6% of men regularly examine their testicles for cancer (although 33% of women examine their breasts), according to a study at Loyola Marymount University in Los Angeles. Testicular cancer is the most common form of cancer in men between the ages of 18 and 31. Men should follow the self-test procedure recommended by Dr. John Goldernring: Once a month, feel the surface of each testicle. It should be smooth, like a hard-boiled egg. If there are any lumps, irregularities, pain, or swelling, immediately consult a physician. This type of cancer is almost 100% curable if detected and treated early.

(FACT PAK FOR THE PHARMACIST, June, 1985)

LIVING TOGETHER: SEXUAL PLEASURES AND PROBLEMS

Unmarried couples who "live together" generally have sexual relations more frequently than do married couples of the same age, and the "cohabitants" are usually more concerned about sexually pleasing each other. However, according to Dr. Pietropinto, sexual dissatisfaction is the leading cause of cohabitant breakups. Notably, the research has shown that living together provides no subsequent benefits in marital sexual satisfaction, openness of communication, emotional closeness, relationship stability, or reduced likelihood of divorce.

(A. Pietropinto, *MEDICAL ASPECTS OF HUMAN SEXUALITY*, August, 1986 & *MEDICAL ABSTRACTS*, September, 1986)

CRACK: NEW COCAINE PRODUCT WITH INCREASED HAZARDS

Crack is a new, potent form of cocaine that looks like tiny rocks, which users smoke in a glass water pipe. Smoking crack produces more immediate and direct absorption of the drug than does snorting (inhaling) of cocaine powder. The result is a quicker and more intense euphoria which greatly increases the potential for addiction, and for serious toxic reactions such as brain seizures, disruptions of normal heart rhythm, respiratory paralysis, and paranoid psychosis. In this survey of callers to the national "COCAINE HOTLINE" 78% of crack users reported developing compulsive use and serious drug-related problems within just two months after first trying crack.

(A.M. Washton & M.S. Gold in *JOURNAL OF AMERICAN MEDICAL ASSN.*, August, 1986 & *MEDICAL ABSTRACTS*, September, 1986)

COUGH DROP SQUARES: KIDS THINK THEY'RE CANDY

The active cough-suppressing ingredient in Mediquell squares is dextromethorphan, a drug that is usually safe for children. However, the cough squares come in 12- and 24-piece packages which resemble chewing gum. That makes the drug "attractive" to children and increases its potential for overdoses. Drs. Katona and Wason reported a boy who "shared" 18 Mediquell squares with another child. Emergency treatment with drug antidotes was needed to rouse him from a sleep-like state. Cough squares and all other drugs should always be kept out of kids' reach.

(B. Katona & S. Wason, *NEW ENGLAND JOURNAL OF MEDICINE*, April, 1986 & *MEDICAL ABSTRACTS*, September, 1986)

ALCOHOLISM: WHY THE ELDERLY TURN TO DRINK

Some elderly people who have no prior history of drinking problems turn to alcohol to numb the distress of old-age loneliness and illness. Most people won't admit to excess drinking, but the possibility of alcohol abuse should be considered in an older person who has an unexplained series of falls, fractures, or other physical injuries.

(C. Gulino & M. Kadin, *GERIATRIC NURSING*, May/June, 1986)

SEXUALLY TRANSMITTED DISEASES: TIPS ON PROTECTION

Concern about "safe sex" is growing as the world faces an upsurge in gonorrhea, nongonococcal urethritis, pelvic inflammatory disease, genital herpes, AIDS, and other sexually transmitted diseases (STDs). Avoiding sexual partners who are likely to be infected and limiting the number of sexual partners is one good way to protect yourself against STDs. If used consistently and correctly, condoms and spermicides also prevent acquisition and transmission of many STDs (as well as preventing pregnancy). However, washing the genitals or urinating after sexual exposure doesn't offer STD protection, the authors say.

(K.M. Stone et al., *AMERICAN JOURNAL OF OBSTETRICS & GYNECOLOGY*, July, 1986 & *MEDICAL ABSTRACTS*, September, 1986)

HEALTH TRENDS: LIVING LONGER BUT NOT SICKER

The life expectancy of older people has been increasing. According to this study, those extra years of life won't necessarily be extra years spent in poor health. When health information collected from thousands of elderly people in the 1963-64 national census was compared with data from 1980-81, the authors, found a consistent and substantial trend toward health improvement in the aged during this time period. The same factors which increased life expectancy (improved sanitation, inoculations, better nutrition, healthier lifestyles, and better medical care) also appear to have improved health and lessened disability for the average older person.

(E.B. Palmer, *GERONTOLOGIST*, June, 1986)

BREAKFAST CEREALS: WATCH FOR HIGH SALT CONTENT

Many popular cereals contain more salt per ounce than salty snack foods. Total Flakes & Kellogg's Corn Flakes, for example, each contain 280 milligrams of sodium per ounce. Kix has 315 mg/oz; Cheerios, 330 mg/oz; and Wheaties 370 mg/oz. In comparison, Wise Potato Chips contain 190 mg/oz; Fritos Corn Chips, 220 mg/oz; and Bachman Twists pretzels, 410 mg/oz.

(S.W. Luger and E. McCormich, *NEW ENGLAND JOURNAL OF MEDICINE*, April 1986 & *MEDICAL ABSTRACTS NEWSLETTER*, August, 1986)

THIS IS FLU SEASON

"Most healthy adults under 65 don't need flu shots. But older people and many individuals with chronic diseases (such as diabetes or heart, lung, or kidney disease) are usually advised to protect themselves with an annual flu shot.

Each year a new vaccine must be manufactured to head off the influenza strains thought likely to cause illness during the flu season. This is because the virus has the unique and unpleasant habit of "drifting" from year to year - altering its genetic make-up just enough to evade the immunity produced by last year's vaccine—an immunity that is short-lived anyway.

This year a problem has arisen, and some people may find they need not one but two flu shots. According to the Centers for Disease Control (CDC) in Atlanta, a new strain of flu, Taiwan flu, has just appeared in Southeast Asia. It is significantly different from the strains of flu covered in this year's vaccine. This is called the Taiwan flu and one characteristic is that it tends to attack people under the age of 35. For this reason, the CDC advises that chronically ill people under 35 who normally get a flu shot should receive this winter's standard flu vaccine as well as a supplement for the Taiwan strain." Those individuals 55 and older or with one of the chronic illnesses, may receive their immunization at the Public Health Department of Orange. Any other person who should receive the regular flu shot may also benefit from the supplement and should see their own doctor.

(University of California, Berkeley *Wellness Letter*, November, 1986)

Compiled by Dolores DelComa, M.A. Health Educator,
Student Health & Counseling Center.

VITAMINS: NUTRIENTS OR DRUGS?

Americans are on a vitamin binge! We spend over \$1.2 billion a year for vitamins and the amount is growing about 10% annually. Yet many nutrition and medical authorities say that vitamin supplements are unnecessary except in special cases.

"Super nutrition" appears to be the goal of some vitamin fans, while others have the idea that vitamins have magical powers to cure what ails them or keep them healthy. Still others use vitamins because they're afraid their snack food, fast food, fabricated food diets are deficient in these essential nutrients.

Vitamins are substances which our bodies need in minute amounts, primarily to regulate body processes. They occur naturally in foods in varying amounts along with the other essential nutrients -- proteins, fats, carbohydrates and minerals.

Because vitamins work in partnership with each other and with other nutrients in performing their functions in the body, the best way for us to get them in proper balance is to eat a wide variety of foods. Good sources of vitamins include fruits and vegetables, whole grain and enriched breads and cereals, milk and cheese, and protein foods such as meat, poultry, eggs, fish, dry beans and peas, nuts and seeds.

Some people may not be able to get all the vitamins they need from food. They may have increased needs because they're pregnant or lactating or recovering from a serious injury or surgery. Or their digestive systems may be malfunctioning due to a genetic defect, disease, drug treatment, or alcohol abuse. Their food intake may be inadequate because of a restrictive diet, poor appetite, fussy eating habits.

In such instances, physicians may prescribe vitamins and/or minerals to supplement the nutrients a person gets from food. But the major use of vitamins by Americans is on a self-prescription basis. At least a third of all adults now buy vitamins over the counter for one reason or another.

HOW TO SAVE MONEY ON VITAMINS

About \$1 billion of the vitamins sold directly to consumers are synthetic -- that is, chemically formulated. The remainder are so-called "natural vitamins" -- extracted from foods -- that often sell for double the price of the synthetic vitamins.

Every synthetic vitamin -- by law -- must have exactly the same chemical formula as its natural counterpart, and our bodies use either kind equally well. In spite of this many pilltakers insist that "natural" is better and are willing to pay the premium price. Often a product with a natural sounding name consists mainly of synthetic vitamin with only a small amount of the more costly natural vitamin. Labels tell you the ingredients of these products.

Competition among the sellers of vitamins is intense and many use major advertising campaigns to convince consumers that their products are superior -- and therefore worth a higher price. But are the differences real? It's unlikely because 60 to 70% of the vitamins sold in the U.S. are manufactured by one company (Hoffman-LaRoche, a Swiss-controlled pharmaceutical firm).

Altogether, in the entire free world there are fewer than 30 producers of vitamins. No one company makes every vitamin, and each of the major vitamins is made

by only a few companies. Bulk vitamins are purchased from manufacturers and packaged for consumer consumption under many labels.

What use is this information to consumers? It tells you that the only real difference between one brand of vitamin and another is the size of the dose and that you can save money by buying the least expensive vitamin having the dose you want.

The safest dose of a vitamin is one which is close to or less than the Recommended Daily Allowance (RDA) of the Food and Nutrition Board of the National Research Council for your age group.

VITAMINS AS DRUGS

Sometimes vitamins are prescribed -- or more likely used without perscription -- in very large or "mega" doses to treat or prevent an ailment. For example, some people take vitamin C in doses 50 to 100 times larger than the RDA in hopes of preventing colds.

When used in megadoses, a vitamin supplement is not serving a nutrient purpose but instead is being used as a drug. Most drug uses of megadoses of vitamins are not based on accepted, well-documented scientific evidence. More often, their use has been promoted by a few self-proclaimed experts with a book or product to sell.

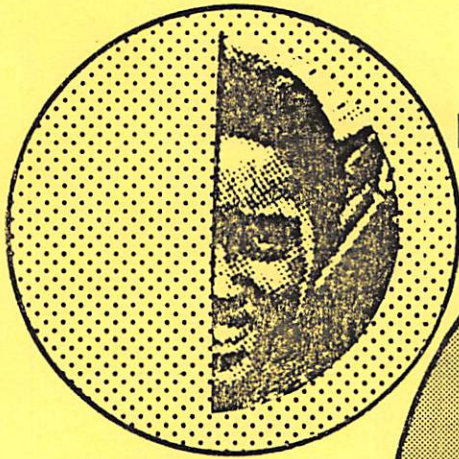
Health professionals are seriously concerned about the escalating nonprescription use of megadoses of vitamins because of their potential toxic effects. Because of this, the Food and Drug Administration (FDA) appointed an advisory panel of experts to investigate and make recommendations.

From the recommendations of these experts, FDA has proposed a rule which would place limitations on nonprescription, over-the-counter sales of vitamins and also minerals. FDA is inviting public comment on the proposal. Send comments to Hearing Clerk, Food and Drug Administration, Room 4-65, 5600 Fishers Lane, Rockville, MD. 20857 by June 19, 1979.

This article published by the Cooperative Extension Division of the U.S. Department of Agriculture.

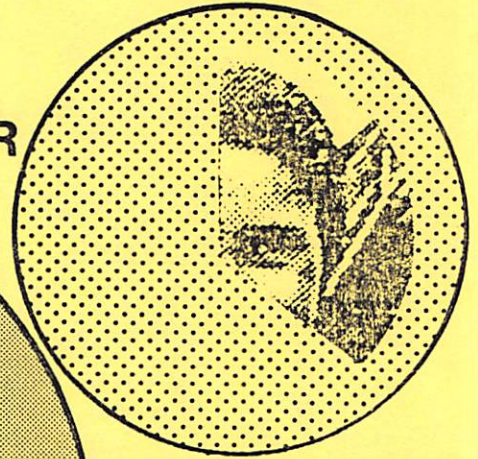
SHCS 0180001

ANTHROPOLOGY 432



NUMBERS

Women are half
the world's population



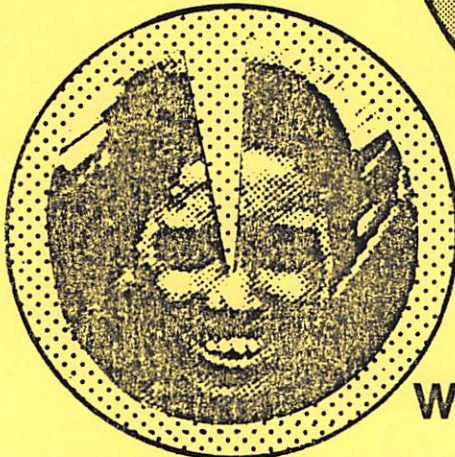
LABOR

Women perform two-thirds
of the world's work

WHAT HAPPENED?

WHAT IS TO BE DONE?

WHAT CAN WE LEARN FROM THE HISTORY OF OTHER CULTURES?



Women receive one-tenth
of the world's income

WEALTH



PROPERTY

Women own one-hundredth
of the world's property

WOMEN IN CROSS-CULTURAL PERSPECTIVE

ANTHROPOLOGY DEPARTMENT-CALIFORNIA STATE UNIVERSITY, FULLERTON

Anthropology 423 Spring Semester, 1987

Tuesday 7:00 - 9:45 pm

I. Match the best fitting word or phrase in each column. Three points each
You may use one answer more than once.

- M 1. Earliest australopithecine site
H 2. Raymond Dart
B 3. Mousterian tool kit
A 4. Hominids of Choukoutain
C 5. Discovered "Java Man"
G 6. Olduvai Gorge
K 7. Epoch of the Ice Ages
V 8. Left cave paintings and "Venus" figurines
V 9. Bow and Arrow
S 10. Gluteus maximus
D 11. Discovered "Lucy"

- A Homo erectus
B Neanderthal
C Eugene Dubois
D Donald Johanson
E William Lovejoy
F Mousterian humans
G Mary and Louis Leakey
H Taungs baby
I Miocene Epoch
J Paleocene "
K Pleistocene "
L Jane Goodall
M Afar triangle
N Himalya foothills
O Swanscombe and Stenheim
P Richard Leakey
Q Diane Fosey
R Homo habilis
S distinctly human muscle
T opening at base of skull
U Cro-Magnon
V Fertile Crescent

47

II. Circle letter before one best answer. Three points each.

1. The first hominids known to practice deliberate burial of their dead:
a. Ramapithecus
b. Australopithecus
c. Homo erectus
d. Neanderthal
e. Mousterian
2. The "Grand Canyon of Evolution" refers to:
a. Olduvai Gorge
b. the Fertile Crescent
c. Bering Straits
d. sites of the Egyptian pyramids
e. none of the above
3. The first hominids to leave evidence of the deliberate use of fire:
a. Ramapithecus
b. Australopithecus africanus
c. Australopithecus robustus
d. Homo erectus
e. Homo neanderthalensis

4. Fossilized remains of Homo erectus hominids have been found in:
 - a. Europe
 - b. Asia
 - c. Africa
 - ☒ d. all of the above
 - e. none of the above
5. Because of the volcanic activity that had preceded the emergence of the australopithecines, the most suitable technique for dating their fossil finds is:
 - a. Carbon 14
 - ☒ b. Potassium-Argon
 - c. Dendrochronology
 - d. Stratigraphy
 - e. all of the above
6. The first hominids who left evidence of adaptation to extremes of cold climate:
 - ☒ a. Neanderthals
 - b. Australopithecines
 - ☒ c. CroMagnon
 - d. Homo habilis
7. In 1912 a skull was found in England which was heralded as the "missing link". Within the next few decades, it was definitely proven to be a fraud. Name.....
 - a. Laguna woman
 - b. Swartcombe man
 - c. CroMagnon adolescent
 - ☒ d. Piltdown man
 - e. none of the above
8. The type of locomotion associated with all australopithecine finds:
 - a. Brachiation
 - ☒ b. Bipedal locomotion
 - c. Quadrupedal locomotion
 - d. Knuckle walking
9. The forward jutting of the lower portion of the face, typical of pongids but quite reduced in hominids and modern humans, is called:
 - ☒ a. prognathism
 - b. diastema
 - c. foramen magnum
 - d. gluteus maximus
10. The archeological record of human occupation of the New World does not clearly begin until approximately:
 - a. 115,000 years ago
 - ☒ b. 25 - 30,000 years ago
 - ☒ c. 10 - 12,000 years ago
 - d. 2.4 - 3.2 million years ago
11. The gap in the jaw, permitting mouths with protruding canines to shut comfortably, distinctive of pongids, rarely seen in hominids or modern humans:
 - a. ischial callosities
 - b. trapezius
 - c. zygomatic arch
 - ☒ d. diastema
 - e. pubic symphases

12. Evidence pointing to the invention of the bow and arrow is found in association with archeological remains approximately _____ years old.

- a. 16,000
- b. 115,000
- c. 48,500
- d. 1.25 million

13. Which of the following is most likely the oldest species among the Australopithecus finds?

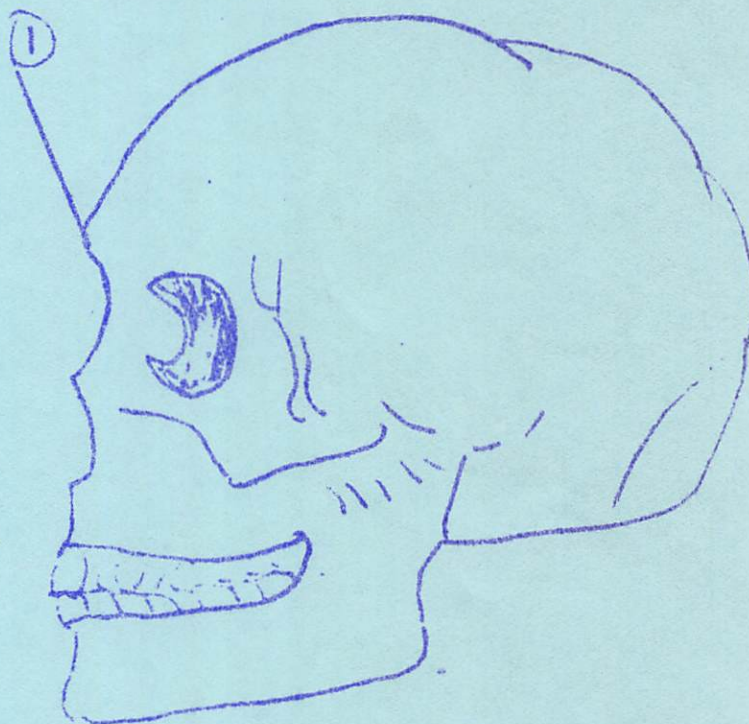
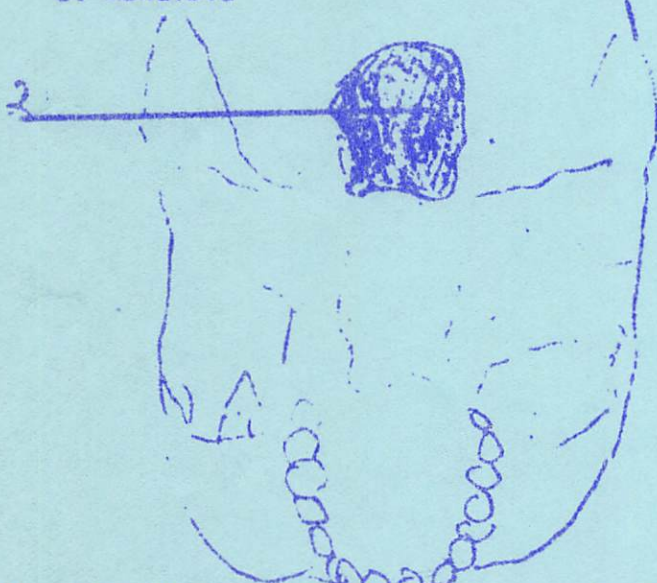
- a. Australopithecus afarensis
- b. " robustus
- c. ✓ " gracile
- d. Homo habilis
- e. none of the above

14. The feature of the human skull sketched below and labelled "1" is called...

- a. supraorbital torus
- b. maxilla
- c. zygomatic arch
- d. foramen magnum
- e. mandible

15. The feature labelled "2" is called:

- a. supraorbital torus
- b. maxilla
- c. zygomatic arch
- d. foramen magnum
- e. mandible



III.. List three traits, apparent in the fossil record, that differentiate hominids and pongids. Six points possible.

Hominid traits

bipedal locomotion

foramen magnum moved forward to support the head in upright posture

dental region is more rounded (not parallel rows of teeth)

Pongid traits

large canines & diastema

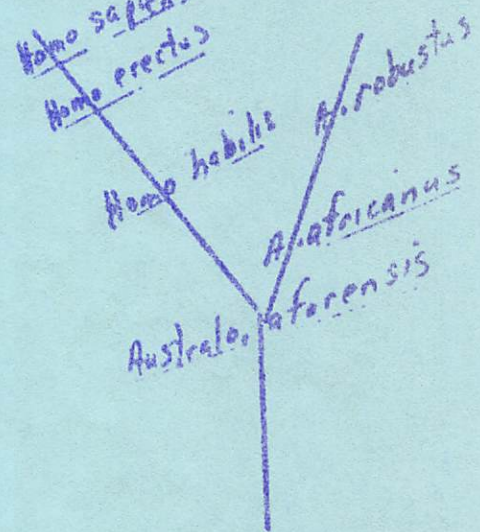
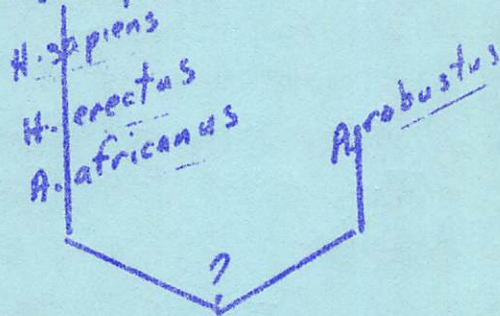
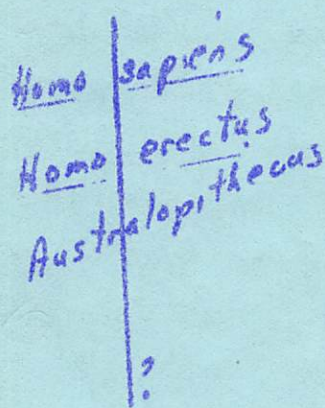
prognathism of the jaw region

larger jaw & supporting skull structure to support chewing action

IV. Use any of the statements that follow for development into a reasoned essay. Use the attached, lined paper and a pen. Factual data carry the most strength. 16 points possible.

1. Compare any two of the hominids we have studied. Consider the style of life available for them, the environment in which they lived, evidence of any cultural adaptations, possible diet, time of existence, physical characteristics, their discoverers and any other factors you may consider important or interesting, or both.

2. Below are several schemes of hominid descent. Select one, or provide one of your own and defend your choice.



3. Discuss the major differences between hominids and pongids in the following characteristics: dentition, locomotion, reproduction, sexuality, brain size and configurations, life style, etc.

4. What major differences would you see if you compared the skulls of any of the australopithecines with Homo erectus and a modern Homo sapiens? What selective forces do you think can account for some of the differences found?

5. Discuss the evolution of tool types from pebble chopper tools of the Lower Paleolithic to blade tools of the Upper Paleolithic. What hominids are associated with the various types and what kinds of adaptations do the tools imply?

ESSAY #2 - HOMINID DESCENT - JIMMY JOHNSON

THE SUBJECT OF HOMINID DESCENT IS A WIDE OPEN FIELD. ✓ UPON REFLECTION THE STUDY OF HUMAN DESCENT IS AN ~~EXAM~~ EXCELLENT EXAMPLE OF THE HUMAN TENDENCY TOWARD CONFORMING OR CASTING EXPERIENCE INTO SOME SORT OF SCHEME OF MEANING *true*. IT IS AN IRONIC POSITION FOR HUMANKIND TO BE UPON THE SELF, PROCLAIMING Pinnacle OF EVOLUTION AND YET NOT BE ADVANCED ENOUGH TO ^{BACKWARD} PEER ^{MUCH} BEYOND 15,000 YEARS ~~FOR~~ WITH ANY GREAT OR OVERWHELMING SENSE OF *insanity* *that is time, a little more anyway*.

I FAVOR THE FOLLOW DESCENT PATTERN: → OVER →



I DON'T KNOW THAT AUSTRALOPITHECUS AFRICANUS IS THE COMMON ANCESTOR IN THE ~~THE~~ DIVERGENCE BETWEEN THE ~~THE~~ AUSTRAL. LINE AND THE HOMO LINE BUT OF THE CANDIDATES PRESENTLY AVAILABLE IT SEEMS TO BE THE MOST LIKELY. THOUGH THE SPECIES IS REPRESENTED BY A VERY SMALL SAMPLING ('LUCKY' & THE ONE 'FAMILY' FIND) IT SEEM TO HAVE CONVINCED ~~THE~~ JOHANSON OF ITS ANTIQUITY BOTH THROUGH IT'S ANATOMICAL PRIMITIVENESS AND THROUGH THE RADIO-METRIC DATING THAT IT HAS UNDERGONE.

~~THE IMPORTANT ASPECTS OF ANY DESCENT SCHEME ARE ~~THESE~~ MORE LIMITED BY~~

(OVER)

a few more now

IMPORTANT LIMITATIONS THAT NEED TO BE ADDRESSED IN POSTULATING ANY DESCENT SCHEME ARE:

- ① THE POSSIBILITIES OF PLACING PAENOTYPICAL EVIDENCE INTO A GENOTYPICAL FRAMEWORK, ② THE PROBABILITIES AGAINST THE PRESENT HOMOINID FOSSIL RECORD AS BEING REPRESENTATIVE OF THE ACTUAL TYPES OF HOMOINIDS THAT HAVE POPULATED THIS PLANET. PUT ANOTHER WAY, THE DEVELOPMENT OF A MEANINGFUL DESCENT SCHEME MAY BE HAMPED BY NUMERICAL &/OR TYPICAL MISREPRESENTATION OF OUR HOMOINID PAST BY OUR FOSSIL RECORD. SCIENTIFICALLY WE CAN TELL LITTLE MORE THAN THE DATE & LIFESTYLE OF OUR FOSSIL RECORDS. THE RELATIONSHIP BETWEEN THE VARIOUS SPECIES IS STILL TOO CONJECTURAL AND GIVEN TO THE CAPRICE OF SCIENTIST'S VISION TO BE SCIENCE. IT IS SOMETHING ALIKE TO A SURVEY TAKEN THAT IS COMPLETELY RANDOM IN NUMBER & — WE CAN ANALYZE AND STUDY THE DATA BUT WE HAVE NO WAY OF KNOWING IF IT IS AT ALL REPRESENTATIVE OF THE PHENOMENOLOGICAL REALITY THAT IT SEEMS TO UNDERSTAND. DATE & TYPE YES, RELATIONSHIPS, NOT YET.



You make a good philosophical argument for the question you chose being unanswered-able. Then why select it? And how justify the scheme you propose? What have you given me on which I can grade this essay?

CONTENTS

Intro to Physical Anth	1
1 VOCABULARY	1
1.1 chapter 1	1
1.1.1 Anthropology	1
1.1.2 Holism	1
1.1.3 Archeology	1
1.1.4 Culture	1
1.1.5 Artifact	1
1.1.6 Biocultural	1
1.1.7 Primates	2
1.1.8 Human Variation	2
1.1.9 Human Evolution	2
1.1.10 Races	2
1.1.11 Osteology	2
1.1.12 Prosimians	2
1.1.13 Forensic	3
1.1.14 Paleopathology	3
1.1.15 Phylogeny	3
1.1.16 Geochemistry	3
1.1.17 Chronometric Dating	3
1.1.18 Geology	3
1.1.19 Hominid	3
1.1.20 Agonistic	3
1.1.21 Taphonomy	4
1.1.22 Paleontology	4
1.1.23 Palynology	4
1.1.24 Hominidae	4
1.1.25 Australopithecines	4
1.1.26 Ecological Niche	4
1.1.27 Estrus	4
1.1.28 Bipedalism	5
1.1.29 Hypothesis	5
1.1.30 Cosmology	5
1.1.31 World View	5
1.1.32 Empirical	5
2 CHAPTER 1: INTRODUCTION	5
2.1 What is Anthropology?	5
2.2 What is Physical Anthropology?	6
2.3 What is PA - part 2	7
2.4 Paleoanthropology & Other Disciplines	8
2.5 What is Human?	9
2.6 The Scientific Approach	10
2.7 Summary	10
3 CHAPTER 2: PRINCIPLES OF EVOLUTION	11
3.1 Introduction	11
3.2 Darwin's Life	11
3.3 Darwin's Theory of Evolution	12
3.4 Darwin's Theory - part 2	13

Intro to Physical Anth

1 VOCABULARY

1.1 chapter 1

1.1.1 Anthropology

anthropos: man
logos: science or study of

1.1.2 Holism

Holism

Viewing the whole in terms of an integrated system; cultural and ecological systems as wholes.

1.1.3 Archeology

Archeology

arche: beginning, ancient
logos: science or study of
The study of material things (artifacts) of past human life and activities; reconstruction of culture of peoples no longer in existence.

1.1.4 Culture

Culture

The set of rules, standards, and norms shared by members of a society: transmitted by learning, and responsible for the behavior of those members.

1.1.5 Artifact

Artifact

artis: art
fact: make
Any object made or modified by humans.

1.1.6 Biocultural

Biocultural

A combination of the biological, cultural, and ecological.
An approach to the study of human evolution and behavior that

stresses the influence of each of these ^{tree} clusters and their reciprocating effects on one another.

1.1.7 Primates

Primates

(pry'-mates; also pry-may'-tees) the order of mammals to which humans, apes, monkeys and prosimians belong.

1.1.8 Human Variation

Human Variation

Physical differences among humans.

1.1.9 Human Evolution

Human Evolution

Physical changes over time leading to anatomically modern human beings.

1.1.10 Races

Races

Breed or variety; subdivisions of a species. Large divisions of humans, based on physical traits. As it applies to humans, the term is not favored by many anthropologists.

1.1.11 Osteology

Osteology

osteon: bone
the study of bones

1.1.12 Prosimians

Prosimians

pro: before
simian: ape or monkey
Common form of Prosimii, a suborder of primates, composed of small primates such as lemurs and tarsiers.

1.1.13 Forensic

Forensic

Pertaining to courts of law. In anthropology, the use of anthropology in questions of law.

1.1.14 Paleopathology

Paleopathology

pathos: suffer

The study of ancient diseases.

1.1.15 Phylogeny

Phylogeny

(fy-loj'-en-ee)

phylon: tribe or race

The evolutionary history of a species; evolutionary relationships of organisms; a "family tree."

1.1.16 Geochemistry

Geochemistry

ge: earth

The study of the chemical composition of the earth's crust.

1.1.17 Chronometric Dating

Chronometric Dating

Dating by methods that give time in years, also known as absolute dating (compared with relative dating). It includes radiometric techniques (carbon 14 and potassium-argon) and dendrochronology (tree-ring dating).

1.1.18 Geology

Geology

The study of the history and structure of the earth, as recorded in rocks.

1.1.19 Hominid

Hominid

The common term for Hominidae, the family to which humans belong.

1.1.20 Agonistic

Agonistic

Agones: ancient

Greek contests; therefore, combative. Used by primatologists to describe aggressive, hostile, or threatening behavior.

1.1.21 Taphonomy

Taphonomy

(taf-on'-o-mee)

taphe: grave or burial

nomy: rules or laws of

1.1.22 Paleontology

Paleontology

(pay'-lee-on-tol'-o-jee)

onta: existing things

The study of ancient forms of life based on fossil bones.

1.1.23 Palynology

Palynology

identifying ancient plants by examining pollen from
archeological sites.

1.1.24 Hominidae

Hominidae

The family, of the order Primates, to which human beings belong.

1.1.25 Australopithecines

Australopithecines

(os-tray-lo-pith'-e-seens)

australo: southern

pithecus: ape

The earliest hominids known; located in South and East Africa.

1.1.26 Ecological Niche

Ecological Niche

(econiche)

The life style of an organism or species in relation to its
habitat; the habitat of an organism or species that makes
life possible; the feeding habits of an organism or species.

1.1.27 Estrus

Estrus

(also oestrus)

oistros: sting, frenzy

Period of sexual heat of females mammals; receptive period.

1.1.28 Bipedalism

Bipedalism

(by-pee'-dal-ism)

bi: two

ped: feet

Walking on two feet as among hominids and some other animals.

1.1.29 Hypothesis

Hypothesis

Unproved theory. A theory is a statement with some confirmation.

1.1.30 Cosmology

Cosmology

kosmos: world

The study of the creation of the universe and the laws that govern it.

1.1.31 World View

World View

A literal translation from the German, Weltanschauung (Welt: world; anschauung: view).

A personal or group philosophy explaining history; a way of looking at the world.

1.1.32 Empirical

Empirical

(em-pir'-i-kal)

empirikos: experienced

Derived from or depending on experience or experiment.

2 CHAPTER 1: INTRODUCTION

2.1 What is Anthropology?

Anthropology (Anth) is the study of human beings. As a scientific discipline, anthropology is concerned with all aspects of humankind: social behavior; language, attitudes, values, personality, gov't, kinship, history, prehistory, art, illness, healing, religion, economics, technology, and clothing, to name just a few. Furthermore, anth is concerned with such biological aspects of humans as body build, pigmentation, blood types and other biochemical traits, our ancestry and ancestors, and the evolutionary processes involved in our physical development. p. 3

Holistic science.

two broad categories: cultural and physical

What is Anthropology?

cultural ---> sociocultural, archeology and linguistics
archeology ---> artifacts

AS a focus of culture, the linguist would take the description and history of language. Ant linguistics is considered a part of cultural anth because language is such an integral part of culture. p. 3

Unlike anth-ists whose main concern is culture, the physical anthropologist (phy-anthist), in a comprehensive study of the Yurok, would collect data on all aspects of inherited physical characteristics, such as body build, blood types, pigmentation, ability to tolerate cold, and susceptibility to various diseases. The phy-anthist would also include notes on such cultural behavior as marriage and kinship, population patterns, migrations, dietary practices, and other cultural behavior that may affect Yurok biology.

bio-cultural approach.

2.2 What is Physical Anthropology?

In order to understand the physical human being, we must of necessity consider the special way of life of this organism. Unlike all other creatures in the Animal Kingdom, we human beings have developed a strategy of adaption (obtaining food, producing the next generation, protecting the group against enemies and the elements, developing concepts of life's meaning) that is learned, not biologically inherited. Although other animals, especially mammals, may learn some things, most of their behaviour is built into their nervous system from birth. Primates are capable of much more learning, and the learning ability of the great apes is now well recognized; nevertheless, no other mammal is as dependent on learning as are humans. While possessing a biologically based capacity for culture, we humans must learn behavior anew every generation. p. 4

Culture, then, is the way humans discover, invent, and develop in order to survive; that is to say, adapt to the environments in which they live. p. 5

What is the connection between these learned processes and our biological constitution? ---> In the biocultural view, culture and our biological structure are critically related. Had we not come from primate beginnings, culture would never have developed, and had our ancestors not developed culture, we would not have evolved our present physical form. The two are inextricably related, and if we wish to learn something of phy anth, we must understand the role culture has played in the process of human evolution. p. 6

HUMAN VARIATION & HUMAN EVOLUTION . . .

HUMAN VARIATION

What is Physical Anthropology?

Human variation examines the differences within and between human populations (chapters 5-7). p. 7

As human biologists, phy-anthist in the field or lab collect such data as susceptibility and immunity to disease, the effects of malnutrition, and patterns of human growth. p. 7

While all human beings belong to the same genus and species (*HOMO SAPIENS*) and can interbreed and produce fertile offspring, there is a wide variation within the species. p. 7

As evolutionary biologists, anth-ists are interested in microevolution, small-scale biological modifications that can accumulate and make for large-scale evolutionary changes. Rapid change=Punctuated equilibrium. p. 7

2.3 What is PA - part 2

As comparative human geneticists, phy-anthists have studied variations among humans and, in the past, have classified the world's population into physical types called races, a practice seldom followed in recent years. p. 10

HUMAN EVOLUTION

Paleoanthropology (pa-anth) is the study of fossil remains of our ancestors. Phy-anthists, together with archeologists, geologists, and other scientists, have unearthed fossil remains in many parts of the world. With their kn of osteology, pa-anthists examine, measure, and reconstruct these remains, often from mere fragments. p. 10

Primatology, as the word suggests, is the study of nonhuman primates, the group (order is the technical term) of the Animal Kingdom to which humans, apes monkeys and prosimians belong. p. 10

observation/investigation: Jan Goodall - chimpanzees in East Africa; Dolhinow with langurs in India; Dian Fossey with gorillas in Rwanda; Birute Galdikas with orangutans in Borneo; baboons in Africa and macaques at the Japanese Monkey Centers.

ACADEMIC ANTHROPOLOGY & APPLIED ANTHROPOLOGY

APPLIED ANTHROPOLOGY

Practitioners of Forensic anth may be asked to ascertain the age and sex of a corpse, and how long it has been buried; they may, in some cases, assist the coroner in determining the cause of death. p. 11

For many years, phy-anth has had application in the field of medicine. The relationship between body build and disease, and the question of whether a particular disease is hereditary or social, have been among those instigated by phy-anthists. p. 11

skeletal biology --- osteologists.

As experts in the anatomical structure of these hard tissues, phy-anthists (here usually called osteologists) can, by using techniques similar to those of forensic anthropologists, often determine the sex and the age-at-death of the individual from which the specimen came. In addition, osteologists can, with the aid of specialized instruments, exactly measure hundreds of different dimensions regarding size and shape variation. Finally, osteologists carefully inspect the skeletal material for indications of such diseases as tuberculosis, healed fractures, arthritis, and rickets. This approach, called paleopathology, can inform us not only about the history of human disease, but can also occasionally help elucidate the causes of certain diseases as well. p. 11

2.4 Paleoanthropology & Other Disciplines

Searching for ancient human remains - organic and cultural - the work of paleoanthropologist. Organic material = bones and teeth examined by phy-anthist; cultural material = tools, weapons, shelters examined by archeologists. p. 11

Paleoanthropology closely associated with/dependent on other sciences:

working out PHYLOGENY (family tree) --> dating info needed --> geochemist for a chronometric dating of fossils or of the matrix containing the fossil material. If insufficient --> geologist analysis of rock strata.

actual excavation --> archeologists

Primatologists data on primate behavior provides analogous backdrop for paleoanths to construct model for hominid origins.

Information re: "the laws of burial" --> taphonomy (relationships between hominids and other animals, hunting practices, etc.)

Information re: ecological environment (things and plants) --> paleontologist and palynologist.

principles of evolution ---> geneticist

cultural setting of early hominids --- cultural anth.

Similarly, primate anatomy and behavior studies done by zoologist, psychologist, psychiatrists, medical scientists, linguists, and others have contributed to the physical anthropologist's exploration of human evolution.

2.5 What is Human?

Human and hominid ?

Hominid --> abbr./popular form of HOMINIDAE, the family to which humans belong (as opposed to Pongidae - the ape family). Term useful because it is unaffiliated with gender, time or superiority. Includes the genus AUSTRALOPITHECINES (earliest hominids known today) -- 4 mya. Also includes genus HOMO. Reluctant to call Australopithecines Human because did not possess eg., complex brain . . . p. 14

Concept "Human" difficult to clarify.

Biological view:

Difference quantitative between Humans and other animals- not possessing physical characteristics lacking in others or radically different but possess same attributes to a greater or lesser degree:

Larger size, less hair;

brain is not the largest in relative or absolute size, but it is very large according to the standards of both;

not only bipedal (birds are); but skeleton for upright posture - hands are free;

all above trait plus elaborated and coordinated under the control of a brain capable of abstract thought ---> remarkable physical uniqueness.

Behavior view:

Econiche: humans different by things lacking:

no mating season (estrus)

most animals build shelters/prepare food particular to their species - humans both behaviors learned --- only accomplished by the use of tools

Our social relationships are not only learned but also vary from society to society. Cultural anth-ists have routinely observed societal differences in marriage, residence, and kinship patterns, in attitudes toward the elderly and the young, and in behavior between the sexes. This behavior different from other animals --- less flexible. p. 15-16

Important difference ---> ability to communicate symbolically through the use of language. p. 16

What is Human?

What then is "human"? There may well be as many definitions as there are human beings! We suggest that a sound explanation of the term be based on the two criteria previously mentioned: first, a body structured for standing upright and walking on two legs (bipedalism), thus leaving the arms free for functions other than locomotion; second, a complex brain that provides the abilities for abstract thought, symbolic communication, and the development of culture as a way of life. With this dual emphasis on biology and culture, our definition once again underlines the biocultural view of human evolution.

2.6 The Scientific Approach

Phy-anth is a scientific discipline and a BIOLOGICAL SCIENCE. phy-anthists employ an empirical/scientific approach to understanding the universe.

"scientific"---> scientists do not seek to disprove religious doctrine -- but try to understand the universe through OBSERVATION. --> Generating HYPOTHESES to explain observations continually tested and modified. p. 16

Strict theologians . . . absolutist cosmology . . . p. 16

hypothesis - theories - laws --->

Because scientists must theorize does not mean that we cannot come to grips with the physical universe and the organisms within it. Scientific theories are only as good as their capacity to explain comprehensively natural and experimental observations, both those already gathered and those that may be made in the future. Some hypotheses, "theories," or "laws" are powerful explanatory principle, indeed: that the sun is the center of the solar system with the earth rotating around it; that our universe is not fixed but in constant motion; that heredity is transmitted from one generation to the next by cells, not blood, to name a few. Organic evolution is also a theory; but like those just noted, it has tremendous explanatory value, and has been confirmed by millions of independent observations. p.17

2.7 Summary

Anth is the study of human beings and their primate ancestors. It is a holistic science divided into two main branches: cultural and physical. Cultural anth is the study of what humans have learned to do in order to adapt to their environment; phy anth, the study of man as an animal, is mainly concerned with human variation and human evolution.

Specialized fields within phy-anth include comparative human genetics, growth and development, paleoanthropology, human osteology, and

primatology. Some phy-anthists have specialized in applied anth, forensic anth, and human paleopathology. For assistance in their research phy-anthists work closely with a variety of biological, social, and physical scientist.

Two terms of similar meaning--- hominid and human ---have been defined. "Hominid," the more inclusive term, embraces australopithecines, which the term "human" does not. Human includes those hominids who display the phenomenon of a complex brain capable of abstract thought, symbolic communication and culture.

Physical anthists, in order to understand the universe, employ an empirical/scientific approach, one based on observation and physical evidence. this method of understanding is opposed to religionist approach, which is based on faith. Since these are alternative ways of comprehending the universe, there is no necessary conflict between them. p. 18

3 CHAPTER 2: PRINCIPLES OF EVOLUTION

3.1 Introduction

As a concept, evolution, during the Middle Ages, was not a view seriously considered by medieval philosophers. Scholarly interpretations of the Bible, especially Genesis, had given European philosophers a WELTANSCHAUNG (world view) in which change had no place. Evolution, therefore, is an idea that would not only have been considered heretical, but "common sense" of the era would have labeled it ridiculous. p. 25

Darwin --- theory of Natural Selection. ----> Looking at human evolution.

3.2 Darwin's Life

Charles Darwin (1809-1882) son of Robert and Susannah Darwin, grandson of Dr. Erasmus Darwin. One of six children-- no specific interest-- Dr. Darwin sent him to study medicine at Edinburgh. 2 years out- not for him.

Christ's College, Cambridge (1828) to study for the ministry (age 19). Companion of Rev. John Stevens Henslow, professor of botany, and often joined his classes in their botanical excursions. Graduated (age 22) 1831. Country cleric?

Voyage of H.M.S. Beagle Dec. 27, 1831 --- uncle Josiah Wedgewood convinced Dr. Darwin and father (recommended for the trip as naturalist by Prof. Henslow). Begun trip as clergyman but hobbies of zoology, botany, and geology found true calling was natural science. matured from an amateur observer into a professional naturalist. p. 26

begun trip as a believer in the fixity of species. His observations quickly raised evolutionary suspicions in his mind. 1832, for eg., he noted in his diary that a snake with rudimentary hind limbs marked "the passage by which Nature joins the lizards to the snakes." He came across fossils of ancient giant animals that looked, except for size, very much like forms living in the same vicinity, and wondered whether the fossils were ancestors of those forms. He observed that the Andean Mountain Range constituted a natural barrier to life and, as might be expected according to geologists, flora and fauna on opposite sides of the range differed. p. 26

Stopover at Galapagos Islands profoundly impressed Darwin -- caused Darwin to wonder whether the theory of fixity of species was a valid one after all. p. 26

Home October 2, 1836 - just shy of 5 year from the date he sailed. 1842 wrote short summary of views on natural selection, revised in 1844. Felt he had insufficient data to support views - continued to accumulate data.

1855 Alfred Russel Wallace published article on the succession of the species - similar to Darwin's theory. Dilemma over getting credit and who discovered/devised the principle of natural selection first. Simultaneous reading both papers ---> July 1, 1858 at Linnaean Society (Darwin ill in bed and Wallace in the Far East.)

"On the Origin of Species" published 1859 --> defended by Thomas Huxley (Darwin's Bulldog).

3.3 Darwin's Theory of Evolution

"On the Origin of Species" (1859) Darwin explained:

- 1) All species are capable of producing offspring faster than the food supply increases.
- 2) All living things show variation; no two individuals of a species are exactly alike.
- 3) because there are more individuals than can possibly survive, there is a fierce struggle for existence and those with a favorable variation in size, strength, running ability, or whatever characteristics are necessary for survival, will possess an advantage over others.
- 4) these favorable variations are inherited and passed on to the next generation.
- 5) Over long periods of geologic time, these successful variations produce great differences that result in a new species. p. 30

"NATURAL SELECTION"

Darwin's Theory of Evolution

Background to Natural Selection:

Intellectual climate of Europe of the Middle Ages ---

Christianity; Ptolemy, 2nd century A.D. "earth was considered to be fixed at the center of a universe of spheres that revolved with perfect regularity around it. Organic and Inorganic world fixed - equally static. Earth had been created on a progression from the simplest forms to the most complex---humans (not evolutionary) ----> Great Scale of Being and the plan of the entire universe was seen as the Grand Design, that is, God's Design. Archbishop James Ussher (1581-1656) creation was 4004 B.C. p. 31

Views changed and challenged by Copernicus (1473-1543) Polish mathematician and astrologer. "The Copernican Revolution is the supreme symbol of the passage from the medieval to the modern world, from an outlook which now seems like a fairyland to the matter-of-fact outlook of the present day." (Dingle, 1959, p. 18) p. 31

Copernicus may not have realized the far-reaching effects of his new celestial system, but scientists of the seventeenth century-Bacon (inductive method), Harvey (circulation of the blood), Galileo (experimental science, central position of the sun, gravity, etc.), Newton (laws of motion and gravity)---gave the intellectual thought of their era a definite naturalistic basis. p. 31

By the early decades of the 1700s, motion, not fixity, had become accepted for the physical universe, but most biological scientists held that change was unacceptable for living forms.

3.4 Darwin's Theory - part 2

Carolus Linnaeus ----> *Systema Naturae* (1735). Linnaeus' scheme was well received throughout Europe . . . He hit upon the simple but effective idea of assigning two Latin names to each organism. The first word would be the generic term---the genus---for the organism and the second word, the specific term---species. Thus, the two words together would become a unit internationally recognized as the name for that particular form. This system of binomial (or binominal) nomenclature was widely accepted, and is still used today. Example of fixity in Nature --- everything can be classified. p. 32

Opposed to static theory, Georges Louis Leclerc --- Count Buffon (1707-1788). Buffon believed neither in the perfection of nature nor in the idea that nature had purpose. He stressed again and again the importance of change in the universe, and he underlined the changing nature, or mutability, of species. p. 33

The contrast between the thinking of Linnaeus and that of Buffon reflects not merely the old and the new, but also the response of many scientists and clergymen to the publication of Darwin's "Origin."

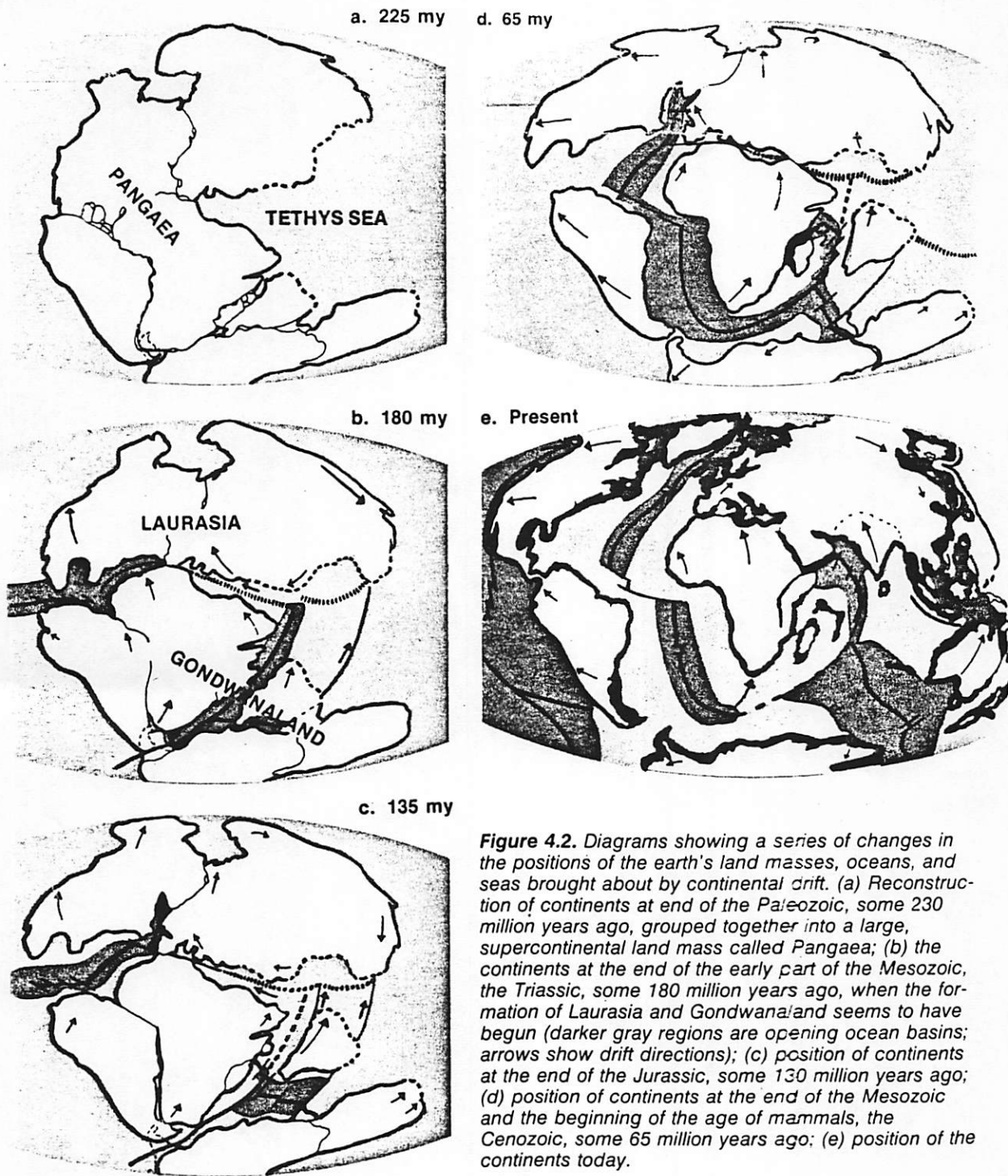


Figure 4.2. Diagrams showing a series of changes in the positions of the earth's land masses, oceans, and seas brought about by continental drift. (a) Reconstruction of continents at end of the Paleozoic, some 230 million years ago, grouped together into a large, supercontinental land mass called Pangaea; (b) the continents at the end of the early part of the Mesozoic, the Triassic, some 180 million years ago, when the formation of Laurasia and Gondwana and seems to have begun (darker gray regions are opening ocean basins; arrows show drift directions); (c) position of continents at the end of the Jurassic, some 130 million years ago; (d) position of continents at the end of the Mesozoic and the beginning of the age of mammals, the Cenozoic, some 65 million years ago; (e) position of the continents today.

10/15 Auth observ

yesterday I sat in a group of
CSUF students - one who was a well-to-do
young woman & had spent a few years
in Germany - nice clothes up there
rose Pine-Feather - meanness -

Today 2 transients - \$2.00 to own
cribble w/ a shopping cart & plastic
bag & grungy soiled clothes -

Another @ the CSUF housing office
looking for a place to stay - a regular
(per the clerk) "Bob" who's been detained
by the prison - better treated - spoke to
me while sharing with him's bathroom
1st floor library.

"at a luck misadventure" he said over
the phone while talking various housing
place (room in exchange for work)
1957 VW stole (towed) by a Mexican
car sleeping in it with pigs garage
(? - I guess) oldest the first transient
but in better shape - from the highest
came at to California to when brother
was sick & ~~he~~ eventually died (90s) hard
to tell how long ago -

when he met the Mexican that
stole his VW was surprised momentarily
& if he might have offended me -
misadventure → assumed I was
Catholic → when I said that I wasn't &
he switched to his evangelistic mode &

begin to "share" with me the message
interesting → was able to personally
present to "make able" ---
I told him about my previous work of
~~Calvary Chapel~~ Calvary Chapel (I'd shared my
membership card ---)

①

862-0635

McCarthy Hall

M - MTH 657 - 102 ANTH - CULT

T - MTH 128 - 101 ANTH - BIO

W - MTH 689 - 305 ANTH - RELIG

9/2

Intro to course & troubles w/ subject.
self intro: Biological Anthro... used to be phys.

→ lab tech before ...

medical anthro ... health/med course
with studies on tribal people of S Cal & Samoa
women & children

not 5 yrs. → Maori people of New Zealand

studying ~~Maori~~ Maori - exploring why getting
medication.

Anthro-ists go a lot of different directions

Biol/Phys Anthro -

① problem - whole focus - evolutionary

prospective → a given starting point; only
look at evidence (no further questions). If
problem back off.

(2)

def: evolu.

↓ changing characteristics w/ element of time

② ↓ emergence of humans Homo Sapiens

question of which are senior species
"humans"? in part ~~anatomy~~ ^{we} → what ~~were~~ ^{was} -

when do we want to call them "human."

No straight answers! many questions w/o answers.

Things
looked
at

Looking at origins & beginnings of things

~~events~~ molecular - chromosomes -

monkeys - ape → humans

blood groups

finger prints

look at larger group Homo Sc.

↓ Primate

humans as natural subjects - examine

power for the sciences bio - psy - soc...

Bio with two major branches: paleontology

study of ancient fossil life - origins
of life. look at fossil are formed / used

② neontology - new life forms - adaptations

(3)

Question re: Nature of our Universe

prob → dealing w/ huge numbers - convinced humans

use neaning when dealing w/ over 1,000,000 etc.

→ extra credit example of 1,000,000 understandable to other.

then Joyce Portrait of an artist as a young man described jesuit education experience → description of "Eternity"

not good feeling for millions...

ex.: visible universe 100,000 trillion trillion galaxies
each galaxy 100 billion stars

Nature of Universe -

How old is the earth/when did it get here....?

Look at the Earth -- every major rel. deal w/ Origins.

India/Brahman Earth + time = eternal

Egypt → Gods creation 36,000 yrs ago origin

Jewish " 6,000 " " " "

His deal w/ trouble of Origins → Bishop Ussher

Ireland (16th century) - using genealogies/ages
creation → 4,004 B.C. Oct 23rd 9:00 A.M.

Science push date back →

tried to (4)

Halley (1715) determined date via science

theory: If first condensation up fresh water \rightarrow I measure how much salt in oceans & measure amt. of salt poured into ocean per year (salinity) could determine year \rightarrow 100 million years (further back

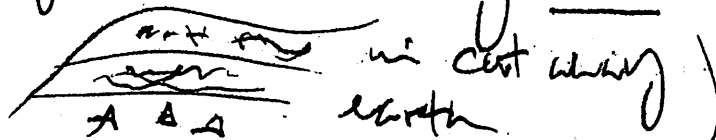
time before) good example -- though messy work - not constant timing mechanism.

w/ this century is great strides.

William Smith (17th century)

Survey / England STRATA

Discovering of ~~secondary~~ levels



\rightarrow 54 major division - ERAS

led to out COMPARATIVE
GEOLOGICAL TIME SCALE

-2010 = 1st SWN

⑥

Big concepts of this.

canonic
Recent

meso - middle

paleo - ancient

protopro - early

Archeozoic

no life

beginning life.

This approach = STRATIGRAPHY

STRATUM

one from life formed

that ~~are~~

single cell algae/bacteria.

(after) shell creatures

Ave. rate of sedimentary deposits 1 ft. = 880 years to deposit. Geologist determine - world wide average.

Oldest rock dated found in N. America - Minnesota River valley 3.3 billion yrs crystallized greenish 3.5 billion yrs.

3.5 billion earth age \leftrightarrow how earth formed

est.

Earth molten (completely) - Earth collected smaller bodies welded w/ radioactive decay.

3.5 billion years \rightarrow single cell \rightarrow traced development & proliferation of life.

⑦

two billion year soup of elements = early H₂ -

↑ necessary → energy to push for chemical reactions → eg. ultra violet radiation (energy source)

Hypothesis ionizing radiation -
storm type (electrical) energy -
settling of molten earth - volcanic energy

Oparin (Russia) Wilson (Am.) - lab ~~sets~~
conditions of early earth - elements +
high energies → protein like substances
(not life) - moving faster time

Life = organization, systems
needs for characteristics.

⑥

Forlagg: Forme (one called algae) \Rightarrow where did they come from? no life \rightarrow life?

Life (biological def.)

1. excitability (to environment) response.
2. Reproduction
3. growth - this cycle -
4. metabolism (energy utilization)

Postulate: before life could emerge \rightarrow proteins would have to come into existence first \rightarrow self-reproductive = life; what were raw materials

- Carbon
 - Nitrogen
 - Hydrogen
 - Oxygen

free oxygen not present. Excretaas
 $\&$ plant life = free ox.; no
 free O w/o plants = reducing atmosphere
 - chemical reactions at different rates.

NH_3 - ammonia
 CH_4 - methane
 CO_2 - carbon dioxide

9/9 Anth 101

①

Defining w/ living things
What is life? -

1. Reproduction
2. x
3. Growth
4. Metabolism

All forms of life can be categorized. (see below)

able to give ^{birth} fertile viable offspring

Kingdom - Animal

Phylum - Chordata

Subphylum - Vertebrata

Class - Mammalia

Order - Primates

Family - Hominidae (upright posture)

Genus - Homo

Species Homo Sapiens → give birth to fertile viable offspring

What can we get from fossil record re: species.

what/where/

Fossil def.: A part/whole/trace of some living organism
dead & mineralized (including "body" cast - impression)

① number of fossils remain minimal (exception) - nature rules
everything is recycled via insect/bacteria. Fossil Δ preserves
most fossils are bones/shells. Fossil → ~~deposited~~ ^{to make} ~~deposited~~

does in undisturbed area w/ water which deposits minerals
in bone gradually changing bone to stone.

Under very rare conditions - soft body parts are
preserved e.g., La Brea Tar pits

(2)

② Another site → in Poland - woolly Rhinos
→ pitch/resin/tree sap → Amber
Possibilities insects etc.

③ humans end up in peat bogs (Denmark/Holland) =
swamp cool human sacrifices

④ Quick Freeze - Siberia - mammoths

→ There not many human fossils - too short to get into
these problems but not many humans alive at that
time
↓
4 million years ago - 3,000 w/ agriculture when
pop. began to increase.

Cenozoic - 70 million yrs. ago - at beginning of that
era N. America climate was very different, e.g.;
fig/liquid trees in Alaska area; fossilized
remains of crocodiles in N. Dakota.

From time ~~that~~ begin to appear to disappearance
of species is about 12 million yrs.

exception → oppossums (25 million yrs. so far)

common cockroach (200 million yrs so far)

~~9000 P. insects~~

③

Not much evid. of life before ~~600~~⁶⁰⁰ million yrs.

Proterozoic ~~span~~ 600 million - 450 million yrs.
only simplest forms - ^{single cell} protozoic - algae - bacteria.

first animals - radio larvae - protozoa -
began to leave shell made w/ silica
sponges/jellyfish

450 - 250 million Paleozoic - ocean turning w/ ^{life} ~~life~~
Invertebrate soft body surrounded w/ a shell/exoskeleton
clams - snails - trilobites → great ancestors to today's
lobsters
descended from primitive worms.

① life finally abundant

② " w/ soft body + hard shell

③ " in the water → era of the Amphibians

→ by the end of Paleozoic trilobites disappeared

★ → some were during period fish like animal
appeared - beginning of skeleton & spinal column
internal skeleton - stiffened supports
bladders

developed a ventral sack; proto-lungs

beginnings of the amphibians - very awkward
locomotion but do have locomotion on the land.

(4)

(all amphibians have to go back to the water to)
lay their eggs → end of Paleozoic

225-100 million years ago
* Mesozoic (reptiles) wet in many different
directions - lay eggs out of water w/ required
nutrients w/ egg (vs. amphibians need water for
nutrition etc) hard shells etc

Experimental work limbs (per Nature) -

amphibians on the sides - Flapping around -
(dinosaurs), shifting P limbs upright posture, problem
no brains, e.g., Stegosaurus 2x elephants
w/ walnut size brains.

All over the earth w/ sudden disappearance.
Theories... ① comet/meteor - fires - screw up environment
② "sterile" nature
③ depopulated by (mammas) egg thieves
④ poisons - well known plants

70 million years ago
Cretaceous

many different types of teeth 4 types

Fish Reptiles - a type V

limbs shifting for locomotion

attention paid to brains

10

paid to reproduction

marsupial - opossum/kangaroo
placental - allow for proper
development for survival

(5)

mammals - all have hair (human odd placement of hair).
bonding between parents & young
amphibians/reptiles → dumping eggs & leaving
mammals → cont. relationship w/ young in feeding -
"leaves" habitat etc from mother.

epochs | Pliocene - archaic mammals

Oligocene - cooling of climate; many mammals & plants in Northern areas disappear

Pleistocene → Ice Age

moraine - impression left by glacier

many of the mammals begin to appear larger

eg. Eocene small (boxterrier) sized horse three toes

Oligocene - sheep size w/ two toes

Pliocene - larger w/ one toe

Pleistocene - modern size.

→ Human around - living in caves around the Mediterranean in caves.

(2)

Fossil Dating

Relative dating

→ Stratigraphy - Stratum geology

shallow ~~shallow~~ & the ancient sea shells & skeletons → limestone sedimentary ground water + pressure above (other layers)

Fluorine depends on principle of relative fluorine content of all fossils of same level (diff. fluorine content = younger/older) tells us relative age to other things (in same stratum, etc.)

Absolute

Dendrochronology

tree rings (one per year) age of tree

principle: Radioactivity present in nature & half life.

Uranium (235/237/238)

1 lb. of (238) will become 1/2 lb used in 4.5 billion yrs

used to
date rocks

Potassium (39/40/41)

"40" disintegrates half life of 1.3 billion yrs → Argon used for dating rocks things related to volcanic activity.

(12 stable) ⑦
Carbon - related to living things

Carbon 14 nitrogen hit by cosmic ray becomes


Carbon 14 \rightarrow combines w/ oxygen \rightarrow CO₂ ^{radioactive}
_{stable}

half life 5,570 yrs.

plant takes in CO₂ excretes O - animal eats

plant w/ C₁₄ - animal eventually dies -

C₁₄ sticks around going through half lives etc.
~~Wrote to the boss~~

lapsed limit of 70 thousand years 

Anth 101 9/16

①

Review

Relative/Absolute Dating

↓
Stratigraphy
Fluorine

Deadrochronology (trees)

Uranium 238 (rock)

Carbon 14 (living things)

Potassium/Argon (volcanic rock)

Processes of Change - 1859 DARWIN The Origin of Species. Wallace, Huxley

Darwin...

studied ministry / ~~law~~ medicine - well-to-do family - naturalist
for the Bessel (5 yrs.) - collector of artifacts

2 questions: ① Why is Nature so luxurious in the measures that it produces - potential production?

② Why do some organisms survive & others not?

Theory of Natural Selection:

2 Facts

- organisms vary (predominant reproduction)

- all organisms produce more potential organisms than could normally survive

(Favorable ~~traits~~ ^{traits} will ACCUMULATE OR "SURVIVE.")

waited to pub origin → irreligion & ignorance of genetics.

~~Alfred~~

Wallace → pub theory of Natural Selection (same time as Darwin) - born poor, worked in Naturalist (curiosity; courage) - 4 yrs in Amazon jungles for museums - lost ~~all~~ it all, wife & children...

Gregor

Mendel

lived/work same time as Darwin/ Wallace. work - ^{monks} ^{2nd son - military; 3rd son -}

Vicinia - thrown out of University twice.

Inheritance traits - not new study - credited to
Furner. Set up scientific study on inheritance.

showed no blending - inherited by discrete particles
looking at seven characteristics in garden pea either/or
things not mixing.

cross round w/ wrinkled seeds

(F₁ all round
F₂ 3 round; 1 wrinkled)?

Phenotype - what can be seen measured
examined

Genotype - what is actually inherited.

♀

		R	r
♂	R	RR	Rr
	r	Rr	rr

→

dominant + recessive
show

(
Genes → Phenotype
RR → Round
mixed → F₁ round
intercross
wrinkled →

recessive genes.

②

DNA

Hereditary chemical substances - traits.

provides genetic code - critical thing about DNA is

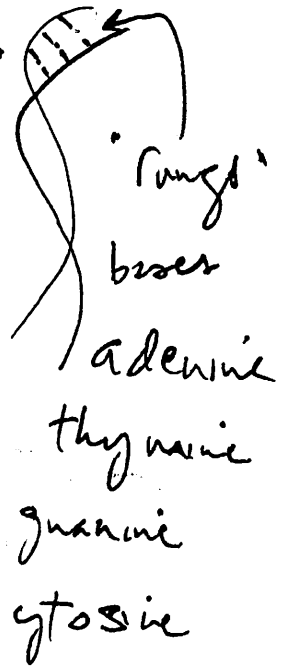
structure → Double Helix. determined 1954

Watson & Crick (Cambridge)

present in nucl. of cell

Cytoplasm

sugar
phosphate



T A
A T
C G
G C

genes → w/

DNA

Chromosome

Interphase -
DNA rep

All other
cells mitosis

DNA rep

↓
chromosomes

meiosis

Sex cells

23 from mother / 23 from father (4)

mitosis - replication

spindle

22 pairs
autosomes

2 sex
chromosomes

female 2 x's

male X + Y

father 9 + 10 - blood

cloning 'X' chromosome upper part
trouble w/ males not found in females
because w/ upper part of 'X' chromosome

extra chromosomes - Down Syndrome (trisomy 21) 1st possible other chromosomes

→ 4000 eggs in a woman's body from birth - later
in life causes 12 chromosome damage passed
on to child (18 year old - younger eggs; 40 year
old ...).

Down
Syndrome

severe brain damage - different personality -
affective - bad heart - free not quite right -
~~heart~~

⑤

• "Creduchot" a cry of the cat
#5 damaged "upper arm" - something wrong w/ the larynx
lives up to a year - "heaving" sound "Creduchot."

Alopecia - no hair - pair of chromosome missing

Sex chromosome -

XX only are active in female
Δ person can have only one
"X" + live X + φ

Females

Turner's syndrome female - slightly different -
short ~~frames~~ for their population - slight retardation(?)
shoulder-arm turned out ^{at rest} - ~~not fully developed~~
not fully sexually developed - sterile - no menstruation
1 out of 2500 births

Sometimes extra X's - normal looking

Males

XXY - slightly taller - slightly rounder shoulder -
smaller penis - if fast breast development - cancer
Klinefelter's syndrome sterile.

XYY - "super males" - extra tall "sign" of extra
aggressive ← not true - more woman, acne in
puberty.

9/23

(1)

Review -

Oct 7! bring a pen!

Heredity \rightarrow factors we don't know about

DNA \rightarrow double helix; 4 bases phosphate/sugar
Brit/American discoverer

Primates

Categories (geological time)

Class - mammals

Order - Primates

relative climatic stability

before Cenozoic Era.

~~Era~~ Cenozoic 70 mill
↑ mesozoic

N. America covered w/ shallow sea etc.

\downarrow then period of "rapid" change - land rising

water retreating \rightarrow 70 million years. -

5 mill. year dinosaurs disappeared - explosion

of vegetation - multiplicity of different types

of plants as land area grows

Prosimians (before monkeys) early cenozoic

w/ rodent population. have went to the

trees \rightarrow Arboreal lifestyle. In keeping w/
not forests

Africa savanna \rightarrow Cenozoic woodland/savannas

②

Life in the trees

Use of tree climbing limbs vs. eg., cats & claws
can go up but not come down → shift away
from claws toward fingers.

Fingers

provides good traction (eg. tire tread) -
- provides sense of touch - nerve endings -
message to & from brain - great motor
control

Brain

develop to support cortex - connected w/
use of fingers -

but -

network / complex brain - preceptual

early simians → move fingers like
a mitter.

Binoocular

Color - Depth Vision - (at the expense of
using much of the size of skull).

Primates

"successful" order - spread out throughout the
world. One reason: general eater - not restricted
in diet → insects, leaves, fruit, meat etc., vs.
characteristics
↓
table bears → eucalyptus leaves etc.

4 types of teeth →

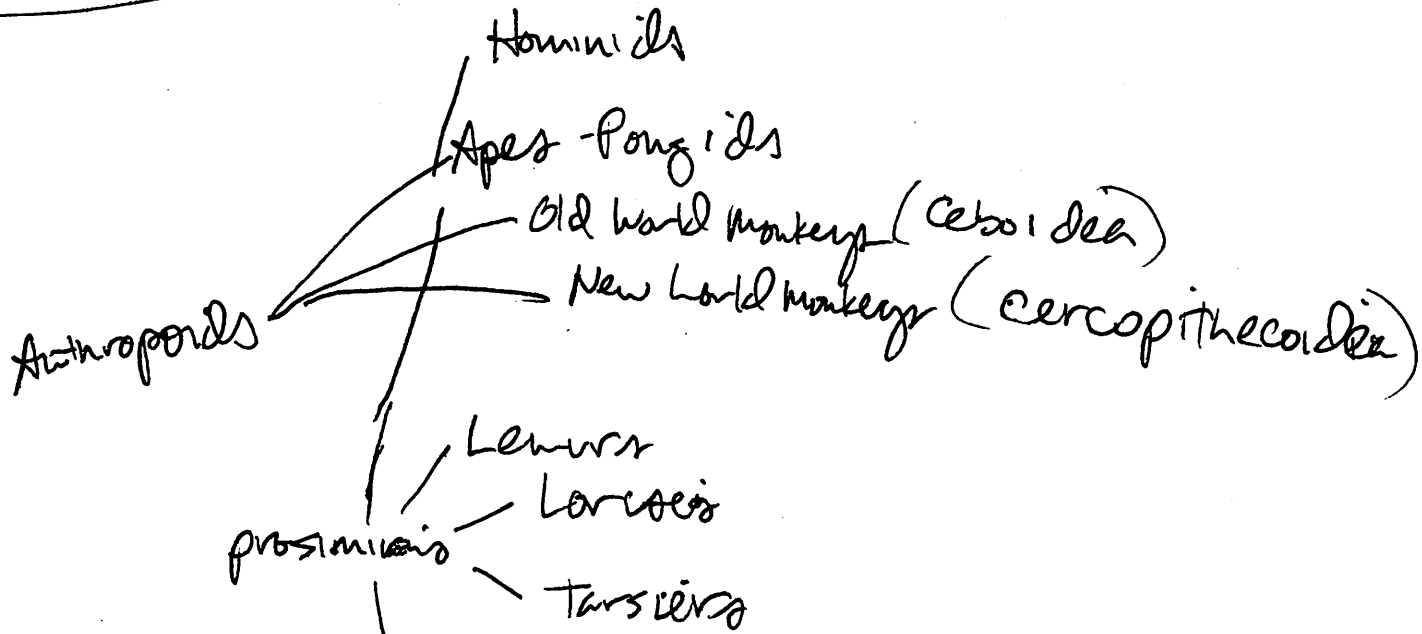
use of the hands & feet - flat with not claws
mobility in thumb; finger print - friction creases -

development of binoocular/color vision (less smell)

continuous development of brain - cranium larger
snout smaller

③
 larger gestation - more elaborate ~~settling~~
 placenta; larger / more intense relationship between
 child + mother - longer lifespan (for cerebral size)
 more complex social interactions.

Primate "tree"



XII Remaining Primates

Living in tropical / semi-tropical; Tarsiers - cat-size -
 all in the trees, nocturnal huge eyes "bigger than their
 stomachs" - can't move eyes w/ sockets head rotates
 180° - five digits 3 claws 2 nails - Vision better
 center - larger / scent center smaller; much into
 "touching" - grooming; mate for life once a year
 neotrate - placenta; life 12 years; one birth a year
 single birth.

Lorises
~~Loris~~

(4)

Africa; Sumatra; Asia India

Arboreal; nocturnal; nails on four fingers + large
grooming claw. Size: small rabbits. Can leap
from tree to tree, sit upright; hop on ground
eat fruits vegetation; loose groups (lifetime)
sleep together (6-8) high branches - maintain contact
w/ each other w/ sound (nocturnal language).
Single births - gestation 16 weeks; cling to
mother

Lemurs

found only on Madagascar (ocene Epoch when
Madagascar split from main land) - no land
no other primate pressure; several species -
prehensile hands/feet; 2nd digit = claw; omnivorous
very social - lifetime group size dependent on
food supply some nocturnal / some diurnal -
grooming; gestation 17-20 weeks - single
birth - dependent on mother - 10 wks self
function

(6)

Anthropoidia

- Monkey { with on tree/lands; no claws
- Apes { stereoscopic/color vision
- Humans { good digit mobility; grasping
- cranial expansion; toward the rear (vision center)
- increase complexity of cerebral cortex -
 - message center...
- reduced facial muscles - expressiveness
- tongues that lap up liquids - gone
- social complexity; less reliance on reflex
 - + ~~more~~ more on learning (capacity of brain).

New world monkeys / ^{South} Americas

After split of the "Am catenient" - prosimians → to monkeys - don't advance beyond stage (apes...)

less pressure from competition/predators in New World

more teeth

New monkeys	36 teeth	2I-1C-3P-3 molars	special in types not advances
Old world	32 "	2I-1C-2P-3 molars	

(all old world monkeys / Apes / Humans) ^{Increase canine predators}

Prehensile tail w/ friction creases (finger prints)

All arboreal - Active during the day - quite social

20 different genera

Howler monkeys

groups; have females the under - nursing
sands - contact of sands

Spider monkeys ...

~~Howler~~ Howler - thin; mother bear & nurse - father
carry 'til next child comes along - used not
physical battles

No killings among themselves.

Old world monkeys

Eurasia - pressure of heavy predation - competition

For food Cape & good hope to Islands & Japan
North limit - similar - adapted to life in
trees \Rightarrow but major part now live on the ground
2-1-2-3 teeth

Baboons; 'leopards'; mandrills; mangabeys ...

chance diurnal - daytime

Ischial callosities - thickened sitting areas on
the rumps - large 4ft. mandrill \Rightarrow 100 lbs.
too large for the trees - menstrual cycles - single
births - nurse young up to 2 yrs; non-sexual white
nursing young - highly individualized behavior & greater
care for the loss of hope of survival.

⑦

group dwellers - vocalizers (only humans sing w/ lyrics) - ^{not} cry & chatter d/ day - ~~were~~ ~~groups~~ ~~sett~~ ~~up~~ wander through forest sleep in large groups.

Baboons/breacots → can produce fertile offspring.

Sexual dimorphism - females smaller than males. (why? ~~efficient~~ efficient use of food - to support young of ~~sett~~)

Baboons extreme dimorphism - studied the most - live in the open - savannas - edges of the forests (analogous to hominid)

Baboons spend the night in the trees in troops; move in troops - largest males in the front - followed by large females followed by other females ~~sett~~ (some w/ infants); older females/younger males surrounding the ~~pack~~ troop (settles) - call out in danger - rush to the trees - big guys in the front

young males as disposable soldiers.



⑧

subsons \rightarrow fight or flight mechanism used/
efficient \rightarrow humans fight/flight = stress!
w/o release.

Adaptation to particular environment -
tool = the group.

①

9/30 ANTH 101 -

Exam comments - 3rd floor loan of class notes.

- Genetics - People - study of evolutionary process
- Primates (Names - T. & G. - Syndromes)
- Dating (chronoscale = 0)

1859 - ORIGIN OF THE SPECIES

- 1 essay 15%
 - watching 3 each
 - multiple choice 3 each
 - short answer
- 100 pts. ARCHBISHOP USHAR Oct 23, 4004 BC 9:30

order

Primate Vision Color Binocular vision - depth stereoscopic
→ 4 types ~~new world~~

2I - 1C - 3Pm - 3m -

2I - 1C - 2Pm - 3m old world.

hairs - body hair - internal temp. reg. -
live birth - nurse young

behavior - very social - touching - maintaining
social contact. Close relationship between
mother & child (longer - relationship to total
life - learning environment).

opposable thumb! Prehensile hand - precision grip.

Position

New World Apes ↔ greater predator ratios - less competition
evolutionary development "less" - settled in level of
New World monkeys - no ape or hominids etc.

⑤

Amazon forest 'high base' stratified
stratified environment in the trees...
vs - bamboo - the savanna - lots of predators.



Apes 3 major kinds of Apes. genus

Family → Pongids / - Hylobates - Gibbons, Siamangs
- Pongo - orangutans
- Pan - Chimpanzees -
Gorilla

Gibbons - smallest -

extremely flexible - flying through the trees (25% tail length)

(brachiator -) moving through the trees elbow-shoulder

movements (overhead windmill...) - falls quite often -
* injured - how does it survive
non-human primate behavior - will not feed

group member in need (food sharing) except for
mother feeding infant - all intelligence / but that
message doesn't sink - will not feed group
member even though relationally close

→ live in small family groups 2-4-

example of sexual dimorphism - males larger
effectiveness of smaller females - efficient food use
carrying & feed infant

6-7 yrs. maturity - parent & some sex pushed out
youngster out of nest → they cannot come back
in. Start own family group.

44 chromosomes → all look like X

③

Orangutan hylobian "old man of the Forest"

very shy - don't survive well in captivity.

strong sexual dimorphism

200 lbs males 80 lbs females

small family groups - frequently found

under a large (only ones to do so besides humans)

8-9 month gestation

6 yrs. nurse

10-12 yrs mature

30-40 yrs lifespan in the wild - don't do well

not in the trees - too big.

Gorilla -

golden ~~and~~ P.R. → King Kong. non-aggressive

preference - wild back - largest/furthest - 6 ft. tall

400-800 lbs. males armspan 9 ft.

1/2 females.

environment shaped them - golden & silver -

untreated - plentiful food - bamboo - celery -

sticks → lots of chewing → 35 lbs of raw vegetation a day - will eat meat if given meat - massive jaws! 14 hrs of sleep a day!

groups 8-24 - 12 yrs → hair silver - very devoted to the young - only non-humans to carry their young -

generally left alone (④) (other - young do the dunging).
not observed sexual activities.
→ don't seem to recognize "need"

young until rotting - 1/3 die - infant mortality
subject to some diseases etc.

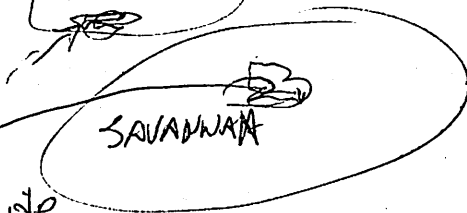
Gorilla Observers
Shaller -

Diane Fossey (LWBA) - trained zoologist
center of poaching controversy
Primateologist - how does one do observation
w/o affecting group.
→ Gorillas are threatened by human encroach-
ment

Amphiprises -

apparently the most intelligent -
primarily on the ground. edges of the
savannah - near the forest - often intersect w/

biomass -
fewer trees through biomass
the chip group - appetite



for meat - dash into group of baboons (eg) snap what
return to trees to eat it - w/ supplicant chips below
arms outstretched pleading & receiving from chip
chip - only example of primates (non-human)

⑤
sharing a meal. - don't recognize death -
large complex brains - can be ~~thought~~ thought
sign language - complex but there are limits
not quite language - no abstract grip - conceptual
is relative - can't sing.
can take something from environment - changing
it - & use it as a tool - ^{eg.} leaf-sponge; tiny termite
prop - tool use;

recently - chimps killing chimps -
Cannibalized - 15 yrs after being first observed
→ possibly going crazy from all the observations.

425 cc. brain size apes

1200-1800 cc brain size humans 1 to 40 brains body.

non-human
- primates don't really change environment - shaped
by environment
- not known to gather store ~~there~~ food
- no home base (stable)
- illness = catastrophe -
- chimps eat on this spot - no storage
daily spent trying look for food - get food or die
association between ~~int~~ offspring to parents
for learning

⑤
moving to life in the trees - hand dexterity -
communication between sensory zone & brain -

brachiate - active arboreal primates -

eyes forward - color ~~depth~~ depth - at the
expense of sense of smell. Olfactory
area (forward section) smaller.

move to trees - pressure for change

adaptations - life doesn't ~~change~~ remain stable.

gibbons - small - for life in trees. → abundant
food

predators → strategy → larger size -

discourage predators - but not able to

reach tree tops - to time group greater area

& ranging 15-20 sq. miles (small monkeys
2-4 sq. miles total life) - knowledge of greater

area - new selection - new stimulation to brain.

Cortex area (message area) increasing

evidence of various fossilized skulls. evolution evident on

25-30% - pushed into evidence Ape

79%

"

"

"

monkey

⑦

upright stature - necessary for brain expansion

not design for speed of locomotion -

- 1 mile \rightarrow 15 mph (if were to be clocked for a low)

(cheetah \rightarrow 70 mph
antelope \rightarrow 60 mph.)

\downarrow why bipedal
use of hands!

COMPARATIVE GEOLOGIC TIME SCALE

Millions of years ago; approximate beginnings	ERA	EPOCH	DISTINCTIVE FEATURES
2	CENOZOIC	Pleistocene	Early humans; continental ice sheets
12		Pliocene	Large carnivores; early hominids; appearance of many of today's genera of mammals
28		Miocene	First abundant grazing mammals; spread of grassy plains
40		Oligocene	Large running mammals
60		Eocene	Many modern types of mammals
70	MESOZOIC	Paleocene	Diversified, hoofed, archaic mammals
100			First primates (?); climax of dinosaurs, followed by extinction
150			First birds, first mammals, flowering plants; dinosaurs abundant
200			Dinosaurs abundant
225			First dinosaurs; abundant cycads and conifers, turtles, etc.
250	PALEOZOIC		Extinction of many kinds of marine animals, incl. trilobites
300			Great coal forests, conifers; first reptiles
350			Sharks and amphibians abundant
400			First amphibians; fishes abundant
450			First land plants and animals
500	PROTEROZOIC		First fishes; invertebrates dominant
2			
3			Earliest fossils
4			Simple organic compounds
5			Condensation of proto-Earth to Earth essentially complete
10	AZOIC		Condensation of solar cloud
			Formation of home galaxy: 1st and 2nd generation stars; supernovae scattering heavy elements into space, available as raw materials in new stars

Adapted from Hammond, P.B. 1976; Hockett, C.F. 1973; Lasker, G.W. 1976; Kelso 1974

SPRING 1986

NAME:

JOE BUSTILLOS

94

I. Select one best answer. Circle the letter on left of your choice. 3 points each

1. Members of the Primate order possess:
 - a. Claws on all digits except thumb
 - b. binocular and color vision
 - c. prehensile feet and hands
 - d. a and b only
 - ☒ e. b and d only
2. The first appearance of plants and animals able to live out of a watery surrounding occurred early in _____ Era.
 - a. Cenozoic
 - b. Mesozoic
 - ☒ c. Paleozoic
 - d. Proterozoic
 - e. none of the above
3. The disappearance of the dinosaurs and the beginning of the paleocene Epoch occurred approximately _____ million years ago.
 - a. 30
 - b. 40
 - c. 50
 - d. 60
 - ☒ e. 70
4. Dominant form of life on land during the Paleozoic Era:
 - a. Tribobites
 - b. Cockroach
 - c. Prosimians
 - ☒ d. Amphibians
 - e. Protozoa
5. The technique of absolute dating, used to gauge the age of ancient trees:
 - ☒ a. dendrochronology
 - b. stratigraphy
 - c. sedimentation
 - d. fossilization
 - e. all of the above
6. The radioactive substance most useful for dating substances associated with volcanic eruptions:
 - a. Carbon 14
 - ☒ b. Potassium-Argon 40
 - c. Uranium 238
 - d. Iodine 121
 - e. Chromium 56
7. Humans, possessing internal skeletons, are members of the _____ phylum.
 - a. animalia
 - ☒ b. chordata
 - c. vertebrata
 - d. anthropoidea

8. In a cross between two pure-bred plants, where one is yellow (Dominant) and the other is green (recessive), the offspring of the first generation will be:
- ☒ a. 100% yellow
 - b. 100% green
 - c. 50% yellow and 50% green
 - d. 75% yellow and 25% green
 - e. none of the above
9. The rungs of the DNA molecule are composed of:
- a. uracil, histadine, tyrosine, glutamine
 - b. asparagine, cystine, glycine, methionine
 - c. lysine, glycine, aptine, leucine
 - ☒ d. thymine, guanine, cytosine, adenine
10. Which of the following is least likely to be dated with Carbon 14 testing?
- a. a human pelvis
 - b. a wooden roof post from a Navajo shelter
 - ☒ c. a copper bracelet from a burial site
 - d. a basket woven from flax and other grasses
 - e. a trunk from an ancient redwood
11. Studies of baboon troops are of special interest to students of human evolution because:
- a. The common ancestor of humans and apes probably had a baboon-like pelvis.
 - b. Baboons, like humans, make tools out of stone and hunt for meat.
 - ☒ c. Baboons occupy living sites resembling those in which the earliest hominids evolved.
 - d. Baboons maintain close monogamous relationships throughout their lifetime.
 - e. all of the above
12. Gregor Mendel's experiments proved that:
- a. DNA is the substances of all living chromosomes.
 - ☒ b. Inheritance is particulate; traits are independently assorted.
 - c. Natural selection is determined by environmental factors.
 - d. Garden peas inherit their distinctive traits through a blending process.
 - e. all of the above
13. Which is the least highly developed trend characteristic of the Primate Order?
- a. intense maternal care for infants
 - b. complex social behavior
 - ☒ c. a highly developed sense of smell
 - d. acute binocular and color vision
14. The Prosimians include:
- a. gorillas, chimpanzees, and orangutans
 - b. baboons, macaques and mangabeys
 - ☒ c. tarsiers, lemurs, and lorises
 - d. marmosets, wooly monkeys and capuchins
 - e. none of the above
15. "Fitness" in an evolutionary sense refers to:
- a. intellectual capacity
 - ☒ b. reproductive success
 - c. body size
 - d. strength, beauty and power
 - e. all of the above

II. Match column on left with best fitting word or phrase on right. PRINT the letter of your choice clearly. Use the indicated space. 3 points each.

- | | |
|--|---|
| <u>Y</u> 1. Mammalia | A. Double helix |
| <u>E</u> 2. Archbishop Ussher | B. XYY |
| <u>F</u> 3. Klinefelter's syndrome | C. Amber |
| <u>H</u> 4. Down's syndrome | D. "The Origin of Species" |
| <u>Q</u> 5. Dental formula old world monkey, apes and hominids | E. 23 October 4004 B.C. |
| <u>A</u> 6. Watson and Crick | F. XXY |
| <u>D</u> 7. Charles Darwin | G. extra #21 chromosome |
| <u>N</u> 8. William Smith | I. extra group B, Number 5 chromosome |
| <u>M</u> 9. Diane Fossey | J. "Father of Genetics" |
| <u>V</u> 10. "Hero of Evolution" | K. observer of chimpanzees |
| <u>C</u> 11. Fossilized pitch or resin | L. observer of orangutans |
| <u>J</u> 12. Gregor Mendell | M. observer of gorillas |
| | N. stratigraphy |
| | O. 21-1C-3PM-3M |
| | P. Opposum |
| | Q. 21-1C-2PM-3M |
| | R. Cockroach |
| | S. Potassium-Argon |
| | T. Dendrochronology |
| | U. 21-2C-2PM-2M |
| | V. Studied Ice Ages |
| | W. Turquoise |
| | X. Dedicated La Brea (Tar Pits) |
| | Y. Class to which <u>Homo sapiens</u> belong |
| | Z. Order to which <u>Homo sapiens</u> belong |

III. Short answer section, each question worth possible 4 points

1. List 4 characteristics that differentiate living from non-living objects. (reproduce)

Living things metabolize (converted energy), replicated, grow (experience growth period), & excrete unused material.
part of metabolism?

2. Differentiate between genotype and phenotype; give at least one example.

The genotype is the genetic composition of an organism.
 The phenotype is the appearance, visual characteristic of an organism. A round garden pea is round phenotypically but may possess a wrinkled garden pea gene genotypically (Rr).

II. Match column on left with best fitting word or phrase on right. the letter of your choice clearly. Use the indicated space. 3 points each.

4. Double helix
B. XYY
C. Amber
D. "The Origin of Species"
E. 23 October 1953 B.C.
F. XYY
G. extra 23 chromosomes
H. extra 23 chromosomes
I. extra 23 chromosomes
J. "Father of Genetics"
K. observer of chimpanzees
L. observer of orangutans
M. observer of gorillas
N. stratigraphy
O. 21-1C-3M-3M
P. Oppenium
Q. 21-1C-3M-3M
R. Cockroach
S. Potassium-Argon
T. Dendrochronology
U. 21-2C-3M-3M
V. Studied Ice Ages
W. Turquoise
X. Dedicated La Brea (Tar Pits)
Y. Class to which Homo sapiens belong
Z. Order to which Homo sapiens belong

1. Mammalia
2. Archdiocese of Ussher
3. Klinefelter's syndrome
4. Down's syndrome
5. Dental formula of world monkey, apes and hominids
6. Watson and Crick
7. Charles Darwin
8. William Smith
9. Diane Fossey
10. "Hero of Evolution"
11. Fossilized pitch or resin
12. Gerdor Mendell

XII. Short answer section, each question worth possible 4 points

1. List 4 characteristics that differentiate living from non-living objects.

2. Differentiate between genotype and phenotype; give at least one example.

IV. Essay - Select any ONE of the statements that follow to expand into an essay - not a list. Use a PEN and the lined sheet of paper attached. Possible 11 points.

- ① Many techniques have been devised for the dating of fossil remains of ancient life as well as of non-living substances.
2. Numerous people have made important contributions to the understanding of the evolutionary process of life on this earth.
3. Parallels with human development can be observed in studies of non-human primates; however, the differences between the two groups are as significant as the similarities.
4. Knowledge of the geological time scale provides a comprehensive picture of the emergence of various forms of life preceding the advent of Homo sapiens. (Repeat - a list will not do.)
5. An understanding of the mechanisms of inheritance makes possible a fuller appreciation of the evolutionary process.

6

Fossil dating can be divided up into two major groups: Relative dating & Chronometric Dating.

Relative dating measures the age of an object in terms of ~~the~~ its age relative to other objects found in the same vicinity. There are two methods used today by which this is accomplished. The first is ~~to~~ to measure Fluorescence in the object & compare that reading with a Fluorescence measurement of other objects found in the same vicinity. While not giving one an actual date one can assess ~~the~~ the object's age in relation to its surroundings. The second method is stratigraphy. ~~The~~ Using this method a relative date is ~~of~~ arrived at by comparing the object with the strata or soil composition at which it was found. Both processes are dependent upon the concept ~~that~~ of Uniformitarianism, that is that whatever processes are taking place today, the ~~the~~ rate at which sediment is being deposited, for example, were taking place at the approximate rate in the past (the concept also includes a provision for these types of processes taking place - volcanic action, erosion, etc.).

Chronometric Dating is achieved by applying the principle of radioactive half-life information. Various objects both living & non-living can be measured for radioactive elements. The major elements looked for are Carbon ¹⁴, Uranium ²³⁸ (^{non-}living things) & Potassium-Argon (used for volcanic material). Based upon the stage at which the elements are found in (half-life) ~~a~~ a date can be arrived at.

Could use some expansion here.

X2

Extra credit:

I don't think I'm of the group from which the gibbons descended. My shoulders did not possess the kind of strength or flexibility necessary for successful brachiating - I was never very good on the jungle gym.

hence mind,
I'm sure there are
many other things
at which you
excel!

and many other things

INTRODUCTION TO ANTHROPOLOGY

I. Kingdom - Animalia (as differentiated from Plantae)

- 1) heterotrophic - acquires food by eating other organisms;
- 2) definite and limited growth period;
- 3) mobility;
- 4) reproduces with little dependence upon environment.

1. Phylum - Chordata (birds, reptiles, amphibians, fish, mammals)
Ventrally located heart, closed blood system, notochord, dorsal nerve tube (tubular and terminating in an enlarged area - brain), segmented body, digestive system, cartilaginous or bony skeleton inside body, caudal appendage (tail), appearance of pharyngeal slits at some stage.

a. Subphylum - Vertebrata

Bony or cartilaginous vertebral column, two pairs of jointed appendages, girdles to which appendages are attached, brain formed from three primary brain vesicles, endocrine system, separate sexes with paired gonads and ducts, endoskeleton, two-layered skin, excretory system, autonomic nervous system.

(1) Class - Mammalia

Body hair; nails, claws, or hoofs; warm blood and constant temperature; four-chambered heart; lungs; diaphragm; usually fetal membranes and placenta; non-nucleated red blood cells, different types of teeth; skin glands: sweat, sebaceous, scent, and tear.

(a) Order - Primates (lemur, tarsiers, monkeys, apes, man)

Nails rather than claws; completely enclosed bony orbit; dextrous, prehensile hands and feet (opposability of at least one first digit to remaining digits); orbits directed forward and encircled by bone; enlarged cerebral hemispheres of brain; one pair of mammary glands, well developed clavicles; brain with posterior lobe and calcarine fissure.

→ visual development

1. Sub-order - Anthropoidea-a- Superfamily - Hominoidea-1- Family - Hominidae

(other family - Pongidae, anthropoid apes)
 118 families of mammals living today

(x) Genus - Homo

Upright posture, large brain-to-body ratio, speech.

(xx) Species - Homo sapiens

①

10/7

ANTA 101

Hominid - began appearing @ the Miocene -
cooling - temperature - why? Ash & geologist -

tropical belts shrinking -
great rift valley - Earth Africa opened up
highlands, forests,

Fossil evidence → Apes → declined

end of
Miocene

← massive drop of temp → Ice age -

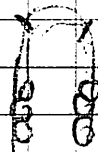
Forest → Grassland -
flourishing of herb animals - herbivorous -
lost common hominid ancestor -
ape-like - but walked on hind feet
lived in forest, moving toward savannas -
forest behind changes = changing environments

Apes - Hominans - diff. chewing apparatus
reduction of molar size in carnivorous

(upright posture w/ hands free)

① shift is one of diet → hard grains - nuts & meats
small incisors - more simple molars
small hard objects to chew & meat

moving from Pongid → Hominans - older stocks ok,
hominid not suited for this
large canines w/ diastema (slot for canines)
& parallel molars



(2)

lots of a vertebrae to support use of lower jaw -
for chewing -

zygomatic arch - muscle support.

~~upright~~
upright -

(Foramen magnum - hole in the head -
where the spinal cord - set → moving
forward for upright balance)

(human → forehead - Protruded like
no distinct no canine -
flaring of the arch toward the rear
by molars.

Africa

Early hominid → Ape → Hominid → Human

Simm & Pilbeam → would make search for
hominid ~~species~~ Rhinoids + categorized -
found 3 major groups. (out 6-7 hundred major
finds) branching

Dryopithecus → Primate

Ramapithecines - hominid → Australopithecus
Siva

Gigantopithecus -

reasonable guess -

two families separated @ the
end of the Miocene → Dryo → to Angid
Reno → to Hominids

Bothwell P. hillman
potashman - argon - In Dec 10 million

(3)

Primate

can't use teeth in Primate display - use
of hands - gesture - Arms free

Why selected Primate? Catapult + arms free.

New dictating approach → much more
dependent on weight - better use of time

Gorillas, chimps using all awake time
to chew & eat
more time for other things.

10/14

RAY SACKS - 5-7 Thursday

Nov 8th → Halloween party → Partners

Early Hominids -

Non human Primates

prognathism - jutting Forward 8th

lower jaw

canines - large

& diastema

frontal torus → large teeth w/ space to close with

robust

zygomatic arch

foramen magnum - spinal hole further back

fragile jaw - no need for frontal torus or
other chewing apparatus

consequently appearance of a frontal lobe

→ center of imagination, flights of fantasy etc,
not much prognathism, foramen magnum forward

Miocene

Propanthropus → moving toward upright posture

big gap - fossil record 8-5 million years ago -
no apes or hominids etc
decline of the forest moved to the savannas →

↓
Australopithecus

②

Australopithecus

shift to bipedalism

(Living things one change results changes elsewhere)
human specialization - to keep one upright

- center of gravity straight through base of skull to pelvis to
- lengthening of thigh bones
- arch of foot
- buttocks - gluteus maximus (1550 cc)
- femur - larger → balance of breast (only humans)
- pelvis larger (full support of body weight)
- more than 1/7 of new brain is brain

human	1 lb	brain	for every	40 lbs	of body
orangutan	1 lb	brain	for	112 "	" "
gorilla	1 "	"	"	120 "	" "

900 - 1800 cc human brain size

400 cc gorilla " "

shift in jaw size - change in food substance

gorilla eating all day - Australo → other things

(not diff only in brain size but - arrangement)

① Robust → 400-500 cc brain size (100 lb body)

human teeth - dead ended - somewhat large jaw
not likely to have contributed to human development

② Africanus (gracile)

more rounded skull - little frontal lobe development
flatter ribcage

Australo characteristic

Tripiece

flatter chest cavity
distinctly human foot (stride) total weight
supported on tip of big toe

- brain development for use of
real language (messages of time
content; range of emotions) sister -
- sing -

left temporal area - language center -
half dollar size - speech mechanisms
teeth tongue lip larynx diaphragm

human → bear hair distribution -

more hair follicles than used
human characteristic → curly hair
non-human primate → all straight hair

temperature regulation - evolutionary
mechanism for change w/ hair dist &
(sweat glands)
use of hand

→ australopithec → better able to provide
for itself - more free from environment

find

Australopithecus → 1925 South Africa 600 find

Raymond Dart (found 1st)

prof of med (anatomist)

→ expected brain size change not posture
shift first

Lewis & Mary Leakey - Rift Valley
*not africa

④

Olduvai Gorge -

Austral → didn't have huge brains but very much upright (w/ tools)

Robust → 120 lbs. no forehead

Leakeys → Homo habilis

X homo habilis - rounder skull Δ
more primitive - others say just another australo-

Afar triangle - Ethiopia
White / Johnson found about 40% of whole skull then

Australopithecus A. africanus A. robustus
very small 3 1/2 ft tall - upright creature
hands are free.
So what?

Leakey's idea
- existence / persistence.

(non-human primates no face to face sexual encounter -
w/ humans - advent of face to face sexual encounter - bonding of sexuality
→ advent of human mentality
primatology - sexual intercourse -
might not know who the mate is

the bonding - straight structure
the structure

the range 3 million years

3 million - Olduvai
border of Kenya like Rudolf
Ethiopia

- Australo
no fossilized
ape skull
beyond 5 million
years.

①

Oct 21

Ex #2 → early hominids -

Nov 4

research relations between
(by Australopithecus) - Australopithecus afarensis
robustus
africanus

Review -

non-hominid:

- Homo habilis

protrusion of lower jaw

distimia - large canines - large jaw structure - prognathism

Paranthropus megathirus
toward the back

supraorbital torus - eyebrow structure

robust zygomatic arch

row of molars & pre-molars are parallel

2 1/2 mil - Australopithecus

Homo Erectus → 19th century found 1st Java then China now plenty
in Africa → brain size

Chinese cave → Choukoutien

Apes → 600 cc.

larger brain selected after upright 2 1/2 mil Australopithecus → 400-450 cc

primate 1 1/2 mil H. Erectus → 800 cc

German Paleontologist - Weidenreich H. Sapien → 900-1800 cc

1930-40's

(1 mil) pleistocene → Homo Erectus

geographic variations → climate flux chain → Ice Ages

water tied up in glaciers move south to center of

North America (southern Wisconsin → line of demarcation
moraine) & Europe

Africa → Europe → Asia 3 thousand years

Five used by H. Erectus 700,000 northern part of Africa & China

(2)

walking through out the world - not ventured
into really cold env \Rightarrow evid of walled structures -

forming some grouping units (family?) -
"swely" N. Africa 700,000 } evidence of fire
China 400,000 }

leaves \rightarrow Homo Erectus (1 mil) years old - tool etc.

"growth" spurts

Huge animals!

Australo ^{Africis} \rightarrow 3 1/2 ft. \rightarrow H. Erectus 5 1/2 ft

H. Erectus - hunters
Australo \rightarrow gatherer/scavenger

Pigs \rightarrow hippo size

Flinders - 2x modern size

Baboon \rightarrow gorilla size

Sheep \rightarrow horse size
etc. rhino

eg \rightarrow aguids - hunting

elephants -

one sub species

elephant ~~killer~~

2+ days - ele drops

from Reaction etc. -

~~eg~~ pigs miss gorge

themselves want eat fir

1 week following

\Rightarrow similar w/ H. Erectus.

theory - 1 mil. before lot of

electric activity \rightarrow soil w/ trace

elements that influence plant life

land -

200,000 - England - stayed

@ on stream several 100,000
tool scraps - etc.

brain size 1200 cc over lap w/
H. Sapiens.

In the 60's Leakey has proved → lost and
 new not held now.

→ needs of hunting required communication

group
language?

→ capacity -

→ need -

Homo habilis → only
 some fragments found

Neanderthal → hominids w/ adaptations for
 living in the cold.

Ice Age

10/28

①

Neanderthal

Homo Erectus (5H. - lucky fire used
China/Africa/Europe
1 1/2 million y

Neanderthal - 105,000 - 40,000 years ago - first hominids

Partly modern - supra orbital torus

→ first to adapt to extremes of cold - edge
of the glaciers w/ woolly mammoths &
cave bear

→ 1st found in Germany 1800's (middle)

Neander (thal = valley) ^{was not accepted as}
humans → thought to be deformed idiots.

distinctive tools → Mousterian - Neanderthal
tools (always go together).

Classic Neanderthal → at the very edge of glacier

(Progressive Neanderthal → further south "core" divided

→ "good" hunters - using strategies in hunting -
using stunnet technique - surround and
pry open stumps of cliffs -

→ set back away from cave mouth → a hearth
surrounded by 5 cave bear skulls. - perhaps
Religious custom

②

severe arthritis in Cave bears &

brain of Neanderthal large \rightarrow same larger teeth
modern though not arranged

Frontal lobe 33% of brain surface \leftarrow the same

(covered 43% per modern)

temporal lobe - auditory cortex well
developed - definite use of speech &

verbal communication. - especially
to down large game (stumpicks etc.)

new brain power -
 \rightarrow practice of rituals -

believed in afterlife - beginnings of religion
sleeping posture - red ochre -

Shamdan (Iran) medicine man - treat
Neanderthal man burial position -

covered w/ seeds & plants - leaves \rightarrow 7 different
types \rightarrow ev. possessing healing powers.

another young person w/ amputation, later eye

accident \rightarrow points to nurturing behavior
being taken care of by others (idea of what
it is to be human)

\rightarrow evidence of homicide - Yugoslavia bone
fragments - possibly cannibalism - bone splits
to get at the bone marrow -

⑤
→ heritage of acts of kindness & violence!
Neanderthal (classic) 40,000 → extinct
were wiped out - possibly by Cro-Magnon.
Progressives under way / Cro-Magnon (?)

Cro-Magnon appear 40,000 years ago -

'more' modern → tendency toward more
delicate bone structure - (vs Neanderthal)
most evidence ~~South~~ European ~~Neanderthal~~

40,000 - 10,000 used after when found.
possibly mixture of Neanderthal & Eastern peoples -

→ human & hominids - "no pure breeds"
possible interbred between hominid types -
Cro-Magnon & Neanderthal

✓
Hunters & gatherers - advance tools - varietal
stone & flint tools → inventors of the

bow & arrow 16,000 - 15,000 years ago -
cold climate but not nearly as cold as the
Ice Age of Neanderthal - lived ~~in~~ near shores
of the Nice/Riviera - abundant food - Retzius
variety of sea food - recovered from

middens (garbage dumps) - bird bones -
lots of raindeer - used fire, more leisure
time - (w/ abundant food source) - tool improvement
use of cave art (plant dyes) first use of clay &
pounded bone for sculptures - Venus figurines →

(4)

Fertility symbol? - large hips, layered
Pet, large breasts - "corn-row" hair but
no face -

Food supplies, easier lifestyle (compared
w/ neanderthals) → population grows -
prospered → more "ground rules" -
simple social structures - kinships - because
numbers were increasing & staying in

in one place longer -
more complex cooking → bar-b-que, 'ho
use & pottery or kettles etc. →

explosion cooking stones - skin buckets

on tripod filled liquid - stew ingredients etc -
heat stones - put in water to heat water -
Repeat 'til stones explode.

Things in the
River & environment Food supplies

- shelter

- reasonable temp / climate

- brain size / capacity

numbers start going up

6000-8000 years ago

(5)

Migration from Southern Europe & East toward
the Fertile Crescent - throughout the world -

(Birth of Agriculture - totally new way)

1.2 -

in Fertile Crescent, Mexico, Asia

Unadvised/Co-migration (20,000 - 36,000 years
ago) - Followed carbon across Bering

Strait (during Ice Ages - masses of
water bound up - glaciers - Bering
Strait shallow etc.)

Review - but by
physical culture

pleistocene = pliocene

Australopithecus - 450 ce.

all together

"

Aferensis (oldest - not
primitive +

"

Robustus - 3 1/2" - upright
dead end

"

Africanus - gracile

modern
human
predecessor?

Homo Habilis

(another form of Africanus)

1 1/2 million ⑥ 700-800 ce

Homo Erectus - total lobe-fire - covered Europe,

Africa - Asia; no burial evidence yet -
 but deliberate ~~use of~~ ^{use of} fire

Neanderthal Man 1000-20000 ce

15000-40000

years ago -

Changes
 were tied up
 they made their
 living, hunting

Chimpanzee / Gorilla picking up food vs.
 hunting strategies of Neanderthal. need for
in mind understanding - memory, language
 analysis, abstract "plan & attack".

Eating meat quite different from eating just
 vegetation → can be done - gorillas eating all
 meat very efficient food - ^{in time} chewing all the time.
 not the best few - entire expansion etc -

life around the camp fire. → also division
 of labor

Point → not necessarily fact or story - but use of knowledge

- development of brain - doubling w/ hunting
- ability to concentrate - patience. Cat got to
 drop to sit still for longer than 1/2 hour.
- communication - ~~strategic~~ strategies.
- home base (?) - kinship groups (feared/panic
 best usage) -

⑦

4/5

⇒ Herding & hunting millions of years - chance -
hunter/gatherer

⇒ Agriculture - up til now lived & died on
what nature provided for them -

8,000 - 10,000 w/ exploited pop - move away from
planting of food / domestication of animals.

not reindeer herds or seal food

(but wild goats, sheep, pigs, -

wild wheat, barley)

6-7000 wildness shows rather ~~various~~ great variety

76% sheep - 1 yr old. & seeds

4-5 mil

↓

10,000

wild food

8-2000 - Farming - use seeds

30,000 chard seeds in Fertile Crescent -

various types of wild wheat grown in
areas some brought)

goats, sheep 1st then pigs & cattle. - appearance
of milk products - use of wool etc.

⑧

- wheat + barley
- pens
- lists

Stone axes - for land clearing +
pen building -

stock holding begins - Fatified wins
walls + fences - to keep others out -

concept of property - things are owned
+ it may not be needed in daily life -
concept of trading -

1st appearance of writing - to keep track
of accounting → writing of history

gould more info -

context - environmental setting
Assoc - what an arch trace is
found w/

(Butchering sites
Quarry sites
Living sites.

suggests a hunter
culture involved in the
industry & preparing weapons
& tracking down game -

(→ Zungu scavengers eat bone marrow
Lungu hunters

Malaria: An Old Enemy Rises Again

By SCOTT KRAFT,
Times Staff Writer

MOMBASA, Kenya—Tourists thrive on the white beaches of Africa's eastern coast, cooled by the breeze that sweeps off the Indian Ocean and sustained by a diet of giant prawns.

Mosquitoes thrive here as well, born in the marshy nooks and crannies inland, growing to maturity under a blanket of hot, muggy air and feasting on sleeping people.

Rosemary Henrich wanted to protect herself from the malaria parasite carried by some of those mosquitoes during her four-day holiday at a luxury beach hotel here earlier this year. So she took chloroquine, long considered the world's primary anti-malarial drug.

But a few weeks after Henrich returned to Nairobi, where she is a nurse at the U.S. Embassy, "I went to open a mayonnaise jar and my muscles hurt so bad I couldn't open it," she said. "My bones hurt." Fever followed. She had malaria.

Travel Agent Stricken

Zebun Akbarali, a Mombasa travel agent, came down with a severe case of malaria about the same time and was in bed for two weeks. Her doctors were surprised. Lifelong exposure to malaria, they thought, should have given her immunity.

In June, a doctor was called to the home of Barbara Allen, then the U.S. consul in Mombasa. She had been ill with a fever for a week. She died of malaria a few weeks later.

Malaria is a perpetual problem for Africa. A 1951 study estimated that 1 million African children die of malaria every year. Today, 35 years later, few experts believe that figure has changed.

But now, visitors to Africa from the developed world, who have no natural immunity, are getting malaria more frequently—and more severely—than before. Strains of malaria able to outwit chloroquine have appeared in East Africa and are moving westward "like a brush fire right across the continent," said Dr. Wallace Peters, a professor at the London School of Hygiene and Tropical Medicine.

New Research Effort

The renewed malaria threat has spawned a worldwide increase in funding for research. At least five major laboratories, including two in the United States, are trying to develop malaria vaccines using genetic engineering. Dozens of other laboratories, from Switzerland to China, are searching for new compounds to fight disease.

Drug-resistant malaria occurs mostly in rural parts—often jungle—of northern South America, Southeast Asia and East Africa.

Please see MALARIA, Page 32

Continued from Page 1

There is also some risk of malaria—but not the drug-resistant variety—in much of Central America, India, parts of China and west and central Africa. It has been estimated that 300 million people worldwide are afflicted with the ailment each year and that 2 million die from it.

Only a decade ago doctors were so confident of their ability to treat the disease that malaria specialists and even entomologists who studied mosquitoes became endangered species.

"Chloroquine was so good.

You could give it and if the patient was not better in 24 hours, you knew he didn't have malaria," Dr. Philip Rees, director of the African Medical and Research Foundation in Nairobi, said. "Now it could still be malaria, and in 24 hours it will be much worse."

Rees and other doctors who treat the most severe cases of malaria now routinely use quinine, which is highly effective but 50 times more expensive than chloroquine, more toxic and more difficult to administer. Quinine is the oldest treatment for malaria, a treatment of last resort that has not been used regularly in most parts of the world since World War II.

About one visitor or non-African resident dies of malaria every month in East Africa, doctors here say. They stress that deaths among people with access to medical care are exceptions. And while drug resistance has made malaria more dangerous, it is still a treatable disease, they say.

"No one should die of malaria

Mosquito nets may be most effective way to prevent malaria.

anyone," said Dr. Keith McAdam, of London's School of Tropical Medicine. "If it is spotted early enough, it can be treated. The trouble is that people come in late."

A malaria parasite in the blood can multiply 28 times every two days. A patient can be comatose, with cerebral malaria, within a week.

"You can go from a safe situation to a dangerous situation very quickly," Rees said. "It's when you sit at home and don't do anything that you get into trouble."

Falciparum malaria, which accounts for 90% of cases in Africa, is the most deadly variety and almost always leads to death if untreated. But the disease can be identified, in all but rare cases, by a relatively simple blood test.

Malaria has been around since prehistoric times. Scientists believe it may have originated in East Africa, the cradle of the human race. The Greek physician Hippocrates—in the 5th Century BC—was the first to describe the symptoms and complications of the disease.

Early doctors noticed that fever, the most common symptom, struck people living near foul-smelling swamps. So they blamed the air, and the disease became known in Italian as *mal-aria*, "bad air." Centuries later, in 1897, a British scientist, Ronald Ross, proved that the malaria parasite is carried by mosquitoes.

The disease is a blood parasite transmitted by female anopheles mosquitoes, whose long life span makes them uniquely qualified for the job. Adult female mosquitoes bite a human being every few days, only at night, and use protein from the blood for reproduction. (Male mosquitoes do not bite.)

The disease is spread when the mosquito draws blood from someone infected with the malaria parasite. While the organism does not seem to have ill effects on the mosquito, the insect becomes infectious 10 days after biting the victim. The infectious mosquito then transmits the parasites with its next bite.

The parasites grow and multiply in the red blood cells. A week or two after the infection, they burst out into the blood stream in large numbers and begin invading other red blood cells. That usually triggers a sudden fever in the victim, signaling the body's attempts to fight the invasion.

The most severe cases occur when clumps of these infested red blood cells begin to block the blood vessels of internal organs, for reasons not fully understood. When that happens in the brain—cerebral malaria—it often results in a coma.

Malaria deaths are commonly attributed to complications from the attack on the red blood cells and resulting damage to internal organs. A tropical-disease specialist explained it this way: "All the systems of the body just pack up and there is no more life."

Africans who live in endemic areas usually have a high degree of immunity by the time they become adults. But nature exacts a high price for that immunity: Many children die. A child fortunate enough to avoid a fatal infection builds a protective shield against the parasites by the time he or she reaches adulthood.

About 60% of people in Kenya, for example, have high levels of malaria parasites in their blood, according to recent studies. Technically they have the ailment, but they do not feel ill. Nevertheless, their blood can infect mosquitoes and restart the cycle of malaria transmission.

Doctors have recently noticed a disturbing trend among these usually immune Africans, however. Growing numbers of them are getting severe and sometimes fatal attacks of malaria.

"When natural immunity is not enough, that is a sign that the disease is changing its coat and getting worse," said a tropical-disease specialist in Nairobi, who asked not to be identified by name for ethical reasons. "I see many more Africans with malaria today than I did three or four years ago."

The deaths of hundreds of thousands of African children from malaria every year for decades did not galvanize the world to action. Nor did the thousands of local deaths in the jungles of Thailand or Brazil. It took the death of Westerners, in increasing but still relatively small numbers, and the threat to formerly malaria-free areas of the world to resurrect the war against the ailment, many researchers say.

Diagnosing and treating malaria in rural Africa is difficult because there is not enough medicine and there are few laboratories. Frequent wars further hamper attempts to provide health care. When a child in an African village dies, no one knows the exact cause. Malaria, chronic diarrhea and malnutrition should not be fatal diseases, but in rural Africa they frequently are.

Africa's children may benefit from the increasing interest in malaria research, however, especially the efforts to find alternatives to expensive medications. Some doctors say, for example, that mosquito nets, used properly, would be the safest, most effective and most economical way to prevent malaria in rural areas.

Outside of Africa, Southeast Asia and Latin America, few physicians

see patients with malaria, and they rarely think of it when confronted with a patient who has symptoms that resemble the flu—fever, nausea, headache, chills and a general malaise. But in Britain, judges have ruled in recent court cases that a physician who has a patient with a high fever should consider the possibility of malaria.

Dr. Christopher Nevill, who heads the malaria unit of the African Medical Research Founda-

tion, thinks that the West should be more concerned about malaria.

The number of cases of imported malaria in Britain rose from 1,934 in 1984 to 2,212 last year. In the United States, about 1,000 cases of malaria are reported annually, and all of them are imported. Ten Americans died of malaria in 1984 and 12 died in 1985, according to the U.S. Centers for Disease Control in Atlanta.

The drug-resistant strains of malaria in East Africa were first detected in 1978. By 1984, hospitals along the coast were receiving calls from distressed physicians puzzled over why chloroquine was not working as well as it once had. Malaria patients once treated successfully in a doctor's office were now requiring hospitalization.

Chloroquine was so widely and indiscriminately used for prevention and treatment that it simply began to lose its effectiveness

against a disease known for its ability to foil attempts to kill it, experts say.

"It's really a very successful parasite," said Dr. David Warrell, an Oxford University researcher who has studied cerebral malaria as director of the Wellcome Trust Research Laboratory in Bangkok, Thailand. "It constantly changes its characteristics, so the host's defenses are always one step behind."

Chloroquine-resistant strains are most prevalent on the east coast of Africa, along a 400-mile stretch from Lamu in Kenya to Dar es Salaam in Tanzania, and on the shores of Lake Victoria in western Kenya. About half of the malaria in eastern Kenya and 25% of it in the west is resistant to chloroquine, according to Dr. A. David Brandling-Bennett, an epidemiologist for the U.S. Centers for Disease Control working in Kenya.

"Chloroquine is by no means worthless, but it is no longer complete protection in East Africa, either," he said.

Kenya's president, Daniel T. Arap Moi, recently declared war on mosquitoes. Five Kenyans were jailed and given lashings for failing to combat the insects' breeding by not clearing brush and keeping their property clean.

Anopheles mosquitoes can breed in virtually any collection of water, including irrigation ditches, hoof prints, ponds and brackish swamps.

Malaria is rare in central Kenya, including the capital, Nairobi, because of its cool, dry climate. The region is more than 5,000 feet above sea level. But conditions are nearly perfect for mosquito breeding in coastal Mombasa.

Doctors disagree about the best combination of anti-malarial drugs to take and about whether to take preventive medication at all. But they agree that the best bet is to avoid being bitten. Because of the mosquito's nocturnal feeding habits, sleeping under a mosquito net provides a lot of protection.

Research into the causes and prevention of malaria has blown hot and cold throughout recent history. In the late 1800s and early 1900s research boomed, the result of the growing desire among the world's powers for commercial projects in the tropics. India, then a British colony, had a large malaria problem at the time. So did Panama, where the United States wanted to build a canal.

In 1957, the World Health Organization began a global malaria eradication program. The results were excellent in Europe and North America but less successful in tropical countries. The group scrapped the program 12 years later, replacing it with a more realistic control program. The program of control, aided by pesticides and drugs such as chloroquine, worked so well that funding for malaria research dried up.

But now the field is active again. Attempts to create a malaria vaccine have generated considerable excitement. The scientist who develops a vaccine against the world's most widespread deadly disease seems a clear candidate for a Nobel Prize.

Scientists at Walter Reed Army Institute of Research in Washington developed a preliminary vaccine but are reworking it after the results of initial trials were disappointing.

It will not be easy to outsmart the disease, scientists acknowledge. The malaria parasite has years of experience at putting up smoke screens to trick the body's immune system. Even Africans with natural immunity to malaria must be reinfected every two years to maintain their protection.

The most optimistic experts say that a vaccine is probably years away.

"But we don't know whether it can even be done," one researcher said. "The bug may simply outwit the vaccine."

during and following the long rains, Mombasa suffered its worst outbreak of malaria in many years. Pharmacies reported unusually high sales of chloroquine, in the liquid form used to treat patients in doctor's offices.

Patients with the more severe cases, usually resistant to chloroquine, ended up in the hospitals. One private hospital brought beds up from the basement and set them side by side, filling them all with patients who had malaria.

"When you got a call of a patient entering the hospital with malaria, you couldn't wait until morning to see them," said one doctor who asked not to be identified by name. He and his partner handled 250 cases of malaria—longtime residents as well as tourists—during those five months, he says.

He said that only two of his patients died, but more than half came to the hospital on stretchers, many of them in comas.

"Things were so bad that we would admit a patient and not even take a chance on chloroquine at all," the doctor said. "We gave up on chloroquine."

The foreigners who became seriously ill with malaria, a longtime Mombasa physician said, "were either ignorant about prophylaxis [prevention], had half-baked or wrong advice on prophylaxis, were repeat visitors who became overconfident, had religious beliefs that kept them from seeking treatment or were free-lance tourists trying to save money by living in hovels and huts."

Barbara Allen, the former U.S. consul general in Mombasa, was especially conscientious about ensuring that her staff took anti-malaria tablets. That was why her friends were surprised to learn later that she had not been taking them herself, apparently because of her religious beliefs. She was a Christian Scientist.

Still, doctors here say that early treatment with quinine would have saved her life. She had been ill at home for seven days before relatives staying with her summoned medical help. The doctor found her drifting in and out of consciousness, a symptom of cerebral malaria. She was rushed to the hospital and treated, but she did not recover.

People who live in Africa collect all sorts of traditional wisdom about how to avoid the disease. Some say that malarial mosquitoes only bite between 4 a.m. and 5 a.m. The truth is that they bite at any time after dark but do so most frequently after midnight.

Some say that malarial mosquitoes cannot survive at high altitudes or in cool weather. In fact, while malaria is most common in tropical climates, it has been transmitted at altitudes as high as 8,000 feet in Kenya and Bolivia, and even in the Arctic during the summer.

The dwindling effectiveness of chloroquine in East Africa has left doctors both here and abroad in a quandary about what to recommend for visitors. The official U.S. Embassy recommendation has changed three times in the past year. A doctor in Mombasa gave these guidelines for tourists—take anti-malaria medication, stay at hotels with good pest control and seek immediate treatment for any flu-like illness.